COMPUTERWORLD

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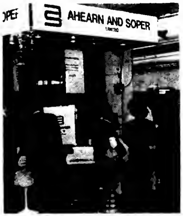

CW Photo by N. French

CW in Canada

Ahearn and Soper Ltd., a Canadian-owned systems house and representative for U.S. systems and peripherals firms, displayed its minicomputer business system at the recent Canadian Computer Conference. Coverage on Pages 8, 10, 29 and 43.

End of Five-Year Battle

FCC Rule Deals Death Blow to DAA

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – The Federal Communications Commission (FCC) has sounded the death knell for the Data Access Arrangement (DAA).

In a far-reaching decision that affects virtually every dial-up user with non-Bell System modems, the FCC has ruled DAA-equivalent circuitry can be built into equipment beginning in April 1976.

The ruling allows independent modem suppliers to include the equivalent network protection afforded by the DAA in their modems once the equipment has been certified by an independent testing source and registered as complying by the FCC.

The ruling culminated a five-year regulatory battle during which AT&T was continually challenged to justify the need for the DAA. The grey rectangular DAAs (or couplers, as they came to be known) were first tariffed by Bell after the Carterfone decision in 1969.

The Bell System contended DAAs were the only sure way to protect the telephone network from potentially harmful voltages and other electrical interference that might be introduced by the direct connection of non-Bell devices. But in numerous regulatory proceedings, AT&T attorneys failed to prove the threat of harm was real.

The FCC decision is believed to follow closely the certification and registration program established by the California Public Utilities Commission [CW, Oct. 29], but as of late last week the FCC had not yet issued its report and order detailing how the new program is to be administered.

The certification and registration procedures will be known as Part 68 of the FCC's rules and regulations and will be administered by the commission's Office of the Chief Engineer.

After equipment has been tested by an independent source according to parameters established in Part 68, the results will be reviewed by the FCC's laboratory in Laurel, Md.

If any questions exist, the laboratory could require the vendor to supply one of the units for testing by the technical staff. In most cases it is believed, however, the test data will be sufficient.

Greatest Impact

The greatest impact of the ruling will be on users of lower speed dial-up lines who now are required to have a telephone company DAA on each line connected to a non-Bell modem. The cost of adding circuitry similar to the DAA inside an independent modem (or terminal) is expected to be nominal.

One company that has built such integrated modems is Vadic Corp. A Vadic spokesman estimated the equivalent of a manual DAA (Bell CDT type) would add about $50 to the cost of a modem, while the equivalent of an automatic DAA (Bell CBS or CBT type) would add between $120 and $150.

It is quite probable the protective parameters spelled out by the FCC are less stringent than that included in Bell's DAAs, in which case the equivalent circuitry could be simpler and the cost lower than the Vadic estimates.

It is not yet known whether Part 68 will also require telephone company equipment to be certified and registered. Some independent technical experts have cast doubt on the ability of Bell DAAs to measure up to the test limits set by the California program.

AT&T is expected to appeal the FCC order first to the commission and then in federal court. But regulatory experts see little more than a delaying action in such moves.

The experts argue the FCC limited the

(Continued on Page 2)

Judge Slapped as IBM Writ Granted

By Edith Holmes
Of the CW Staff

NEW YORK – Agreeing with IBM that the judge hearing the government's antitrust suit against it has overstepped his procedural bounds, the Second Circuit Court of Appeals here has delivered a gloved – but public – slap to Judge David N. Edelstein and the Department of Justice.

The appellate court decision ordering the trial judge to vacate three of his rulings and orders presumably will limit the "irreparable damage" IBM counsel claims its client's defense has suffered as a result of Edelstein's actions.

But the opinion could also have the effect of extending an already lengthy trial by opening the door to numerous delaying tactics.

IBM sought relief from some of Edelstein's procedures by petitioning the appeals court in mid-October for an unusual writ of mandamus [CW, Oct. 22]. Specifically, IBM asked the appellate court to reverse orders which prevented the defense from privately interviewing government witnesses and from making oral motions in open court during the trial.

Counsel for the corporation also requested that Edelstein be compelled to file all of the papers submitted by IBM with the clerk of the court.

The appeals court heard oral agruments from IBM and the government on the matter Oct. 22 [CW, Oct. 29] and handed down its opinion on Oct. 30.

"This is not an ordinary case and will not be an ordinary trial," Judges Leonard Moore, Ellsworth Van Graffeiland and Thomas Meskill said in their decision granting IBM's requests across the board.

Neither was the three-judge panel's ruling in favor of this particular form of relief "ordinary," according to several observers.

The appellate court noted in its 18-page decision the government had asked the judges to "discourage in the strongest possible language the filing of petitions for extraordinary relief raising issues as insubstantial as those raised in this case."

But, the judges said, they did not consider the issues "insubstantial."

While commenting they had "the greatest respect for Judge Edelstein's efforts to conduct an orderly trial" and recognized "the possibly unprecedented burdens which that case has presented," the appellate judges ruled the trial judge had acted "entirely outside the permissible bounds" of his discretion and jurisdiction.

For this reason, the appellate court contended, the request for a writ of mandamus was appropriate, but added it did not expect to review every disputed ruling

(Continued on Page 4)

Catamore, IBM Joust in Court Over Attempt to Upset Judgment

By Molly Upton
Of the CW Staff

PROVIDENCE, R.I. – Attorneys representing Catamore Enterprises, Inc. and IBM squared off against each other before Judge Raymond J. Pettine as they presented oral arguments on IBM's motion for a judgment in favor of IBM or, alternatively, for a new trial.

Pettine now must decide whether to uphold the jury's verdict awarding Catamore $11.4 million in damages [CW, July 9] or to overturn that decision, which would free IBM from paying Catamore anything.

Either way, the next step open to the dissatisfied party would be the appeals court.

Although not presented in court, the judge also has under consideration Catamore's motions for sanction against IBM attorneys for the language in their motion [Sept. 3]. Catamore also is asking for reimbursement of trial expenses and the interest on the $11.4 million owed it by IBM.

Calling in a new attorney, IBM was represented by Jack Brown of the Phoenix, Ariz. firm of Brown and Bain. Presenting what one observer termed a "wall of flesh," young IBM attorneys sat in the rear of the courtroom while chief counsel Nicholas deB. Katzenbach made his first appearance before the bench.

Brown's argument centered on two facets of the case: multiplicity of charges in the damages and the leniency Pettine accorded Catamore in presenting its case

'Shocking Verdict'

Calling the verdict "shocking," Brown told Pettine the question "How could it have happened?" should be asked and

(Continued on Page 6)

CPU Duns Long for 18 Cents

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. – The taxpayer wouldn't really miss it and the Internal Revenue Service (IRS) certainly didn't need it, but it was the principle of the thing, and it has now stretched out into a five-month controversy.

The taxpayer is Rep. Clarence Long (D-Md.), who refused to pay the 19 – or 18 – cents interest on a $5.48 IRS bill he had previously paid – twice.

The IRS told Long the computer was at fault, that it hadn't caught up with things. But the IRS did not explain how an interest charge had changed from 19 cents one month to 18 cents the next.

When contacted concerning IRS computer programs, spokesmen at both Philadelphia and Washington IRS headquarters refused to comment, citing the Privacy Act, even though the questions asked pertained only to technical details, not Long's return.

The only IRS comment was that "this sort of thing happens with any program occasionally. We're like any other DP shop. It's not a wholesale foul-up, just a snare in a few returns."

This return, however, belongs to a congressman who sits on the House committee which appropriates funds for IRS operations.

The congressman had made a slight error on his tax returns and received a bill for $5.48, according to Jean O'Neil, a Long aide. The bill was promptly paid.

A week later Long's tax rebate arrived and, rather than the $100 to which he was entitled, the check was for only $94.52, reflecting a reduction

(Continued on Page 4)

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For 'Illegal' Operating Systems

Honeywell Offers Users Software Deal

By Nancy French
Of the CW Staff

WALTHAM, Mass. – Users who bought Honeywell systems from non-Honeywell sources and who have been using the accompanying Honeywell operating systems "illegally" [CW, Aug. 6] can obtain licenses for those operating systems at a reduced price as long as they act before Dec. 31.

Provided their systems were up before Oct. 1, users running under Class II operating systems, which are no longer in development, have been offered licenses for a one-time charge of $100.

Users of Class I operating systems who began utilizing them before Oct. 1 have been offered a license for a one-time charge of $100 plus a monthly license fee starting next Jan. 1.

For example, an O/S 2000 user would be absolved of paying the standard one-time license charge but, starting Jan. 1, would be assessed a monthly license fee of $350.

The one-time license charge for O/S 2000 is $35,000; for O/S 200 it is $9,500.

The offer does not apply to systems obtained after Oct. 1, and users who are planning to buy Honeywell systems from non-Honeywell sources should be aware of the mainframer's license fees for operating systems, according to Richard R. Douglas, vice-president of data processing operations for Honeywell Information Systems.

Users who obtain used systems from Honeywell receive a license to use Honeywell operating systems as part of the lease-purchase package at no additional charge.

Honeywell announced the special offer in a letter to field personnel dated Oct. 3, and Douglas made the program public in an interview here recently.

"Software is not a reel of tape, it's a service," Douglas emphasized. "Honeywell has never sold software with equipment, because to do so would mean that customers would buy software at a specific point in time and would not be eligible for the enhancements, improvements, modifications and so forth that are provided over long-term periods."

Honeywell "treats any user who is licensed to use our software the same as a user who buys our system," he explained. These users get all documentation and all updates, he said.

Class II operating system software is "no longer actively marketed" and is licensed on the basis of a one-time charge.

Class II operating systems include the Mod 1 TR; Mod 1 MSR; O/S 200; G-400 DPS; Maps; Daps; TSPS; TSPS/Daps; G-100/200; H-400/1400; H-800/1800; Mod 4; Mod 8 and Mod 2.

Class I operating system software is still actively marketed and is being offered for license for a one-time charge plus a monthly license fee.

Class I operating systems include the O/S 2000; Gcos/62; Gcos/6000; Gcos/66; Gcos 600.6023 and 6051; Gcos/61 and Gcos/64.

FCC Deals Death Blow to Bell DAA Requirement

(Continued from Page 1)

ruling to data devices to blunt a Bell challenge, the FCC order specifically excludes PBXs and telephones pending more study.

Since data communications devices (by Bell's own admission) account for only 5% of telephone company revenues, it will be difficult for AT&T to object to the ruling on economic grounds. This fact, coupled with AT&T's failure to prove the technical need for DAAs, will make any regulatory or legal challenge to the ruling very shaky, these experts say.

Nevertheless, AT&T is expected to exhaust every avenue to delay implementation of the DAA elimination. The FCC ruling said AT&T will have to change its interconnection tariffs in time to take effect by April 1, 1976. But a delay in the start of a more liberal interconnection program is a very real possibility, regulatory experts believe.

Chairman Tells More

BOSTON – Some details relating to the Federal Communications Commission's (FCC) interconnection decision eliminating Data Access Arrangements (DAA) were revealed here last week by Richard Wiley, FCC chairman, in a speech before the annual conference of the National Association of Regulatory Utility Commissioners.

A program of certification and registration will allow the FCC to focus on the very limited portion of independent equipment which contains the protective circuitry and will reduce the time and expense associated with administering the new procedures, Wiley said.

Circuit diagrams provided to the commission staff as part of the program will be limited to protective circuits only, he said.

Anticipating comments to be received in response to the FCC ruling, Wiley said he was "very hopeful that we will be able to at last lay to rest the controversy concerning Carterfone and [equipment] competition."

A spokesman for the Independent Data Communications Manufacturers Association said that if the FCC regulations require both carrier and noncarrier equipment to be certified and registered on an equal basis, "it will be a great benefit to all users.

"It will result in technical improvements and simplified overall system reliability by removing an unnecessary cost element and by removing an unnecessary system component," the spokesman said.

On the Inside This Week

NEWS

Contenders for Seattle Contract Knock Each Other Out . . .5
Properly Prepare Customers, Employees for Scanning 8
DBA Job Too Big for One Person; Team Concept Urged . .10

COMPUTERS AT WORK IN GOVERNMENT

Congressmen Finding Data-Accessing Techniques Vital 11
County Punches In-House, Processes at Private Site 12
System Maintains Assessment/Market Value Ratio 13

EDITORIAL

Editorial: Bridging the Gap 14
White Hat, Black Hat: Left Out! .15
Taylor Report: Crediting Method Penalizes Customer 15
Assembly Line Concept Speeds System Development 16
Programmer Mystique Can Enhance Professional Image . . .18
Companies Often Not Insured for DP-Related Risks 19

SOFTWARE & SERVICES

'Domain-Specific' Languages Would Help: Hammer 21
"SSDM' Backs Structured Programming 23
Identify Goals or Expect CPE to Fail, Conferees Warn . . .24
System Architecture May Alter Apparent Priorities 26

COMMUNICATIONS

AT&T Introduces Synchronous Dataspeed Terminals 27
Attorney General Urges Interconnect Liberalization 28
Shoppers Order Catalogue Items Directly From System . .29
Burroughs TU 1700s Designed for Banking Industry 32

SYSTEMS & PERIPHERALS

Mass Storage, Part 2: User Benefits 33
Itel Plans 3350, 3850 Equivalents 33
User Sidesteps Card Costs by Switching to Key-to-Disk . . .34
Hierarchy of Systems Helps Maker Test Carburetors 35

MINIWORLD

System Aids Artificial Heart Study 37
Company Uses Minis to Test Space Fuel Tanks 38
Mini Copes With Increased Workload 39

SOCIETIES/USER GROUPS

Hammer, Winklar to Lead NCC Steering Committee 42
Married Team Earns Citation 42

COMPUTER INDUSTRY

Burroughs Plans 800 Family Spanning Product Range 43
PTT, Mainframe Plans Concern Europeans 43
Olivetti Focuses on Terminals 45
Monitoring of Network Contracts Vital 46
Exhibitors Cautiously Predict German Mart Upswing 47
HIS Building Minis in Massachusetts 48

FINANCIAL

Data 100 Income, Sales Incraase in Three Months 49
Telex Earnings Show Strong Gain 58

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Court Panel Grants IBM Mandamus Writ

(Continued from Page 1)

during the trial in this manner.

Taking for its own many of the arguments advanced by counsel for IBM, the judges cited the government's failure to prove many of its claims, among them that "IBM was harassing our witnesses."

With regard to the restrictions Edelstein had placed on interviews with adverse witnesses, the appeals court expressed its concern that the presence of a stenographer to transcribe or of a member of opposing counsel to listen to conversations with witnesses would inhibit "the free and open discussion which IBM sought."

In addition, the judges indicated they found very disturbing the trial judge's order that he be provided with a copy of the transcripts of such interviews.

"This condition is tantamount to an insistence that the trial judge be present at every interview and thus become cognizant of each proposed witness' statements even though such witness may never be called upon to testify," the appeals court said.

The panel added, however, that "there is no question but that the trial judge did not intend adverse results to flow from his rulings . . . The record indicates he felt the establishment of formalized interview procedures would aid the court in its ultimate determination on the merits and would also insure the integrity of the trial by guarding against the exercise of undue influence upon prospective witnesses by interviewing attorneys." The appellate court simply said it disagreed with the methods chosen by Edelstein for achieving these ends.

Papers Filing Crucial

The court indicated Edelstein had also exceeded his authority by not filing certain papers submitted to him by IBM counsel on the grounds they had not been given to him at the appropriate time or with the proper accompanying documents.

"Filing at the trial court level with a view to 'making a record' is crucial because, |without| extraordinary circumstances, federal appellate courts will not consider rulings or evidence which are not part of the trial record," the judges warned.

Finally, the appeals court ruled Edelstein, who requires most motions be put in writing, will have to hear such normal motions as objections to the admission of testimony or exhibits and motions to strike certain testimony when these are advanced orally in open court.

Noting that "the burden of hearing oral motions may prove onerous and even distracting during the course of a lengthy trial," the judges said such motions were nonetheless "obviously necessary to expedite the trial."

While the appellate court said it saw no reason why IBM's papers charging certain government attorneys with misconduct should not be filed as the government's charges have been, it told the parties they could ask Edelstein to keep the documents under seal. The judges reiterated their understanding that Edelstein intends to hold a hearing in this matter.

Neither the trial judge nor the Department of Justice has made any public comment on the appeals court decision. That decision can be appealed to the Supreme Court under some circumstances or can be reheard by the full nine-judge panel of the Second Circuit Court under other conditions, but the government has not yet decided whether it will seek either remedy.

The long-term effects of the appeals court decision are difficult to perceive, observers agreed; there seem to be several possibilities.

Certainly Edelstein will be forced to toe a more rigid line than that to which he has been accustomed. If he is successful in following the dictates of the appeals court and IBM loses the case in the district court, an appeal by the defense on procedural grounds might actually be weakened, the observers said.

For its part, IBM counsel is now in a better position to employ the full range of weapons in its legal arsenal. The behavior of the defense in the past indicates it will surely use every means available to it, one observer remarked.

The Justice Department appears to be least directly affected by the decision. But, another observer noted, "it will be more difficult for the judge to shield the government's case from attacks by IBM, if that was ever his intention."

Still another commented on the lack of preparation and persuasion in the government's oral arguments on behalf of the judge before the appeals court.

"I hope the Justice Department does a better job in presenting its case in the district court," he said.

CPU Duns Rep. Long for 18 Cents

(Continued from Page 1)

of the $5.48. This meant the IRS had collected twice for the same payment, O'Neil said.

Long then called the IRS, which told him to stop payment on his check. Shortly thereafter he received another bill for $5.48, this time with a $5 fine for stopping payment tacked on.

Yet another phone conversation with the IRS assured the congressman the fine would be waived. This conversation was followed by the receipt of an IRS check for $5.48 in the middle of June.

Then a phone call from the IRS advised Long not to cash the check, but to hold on to it until he received still another bill and to return the two together.

On Aug. 25 a bill arrived for $5.48, plus the $5 fine, plus 19 cents interest. A subsequent September bill eliminated the fine, but charged only 18 cents interest.

"We think the matter is finally cleared up," O'Neil said, "but that doesn't mean that we won't be getting another bill in the next few days."

Long has stated that, if the bill had been for $16 or $160, he couldn't have taken the risk of fighting the IRS because he undoubtedly would have been accused of trying to get out of something politically.

"We have found other cases, checking back over the last six months' worth of casework, where the problem was clearly a computer error," O'Neil asserted. "A programmer is fouling up somewhere."

Long said he has been able to convince IRS officials that if its computers make a mistake, taxpayers should not be penalized.

And to highlight his point, Long is drafting a bill, the Taxpayer's Bill of Rights, to correct what he calls the "double standard" of charging taxpayers interest on money owed the government, but paying taxpayers no interest on amounts "overwithheld" from their salaries and later refunded.

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Contenders for Seattle Contract Knock Each Other Out

Special to Computerworld

SEATTLE – Two contenders fighting for a facilities management (FM) contract effectively knocked each other out when the City Council here rejected both bids after several rounds of charges and countercharges.

The first blow was struck when Boeing Computer Services (BCS), a local firm, took "strong exception" in August to the mayor's recommendation that the city award a contract for converting from an in-house to an FM operation to Computer Sciences Corp. (CSC), headquartered in California.

BCS requested "an immediate and full disclosure of the evaluation and selection process" in a letter to the city in September.

The city wanted to award the five-year, $15.9 million contract to CSC because its proposal "was rated best technically and [it] was the low bidder," according to John Elliott, assistant budget director for management information systems for the city.

The BCS position was "more critical than it should have been in the heat of disappointment," he said.

BCS, however, charged the city made a $1 million arithmetic error in evaluating its bid and leaked information from the BCS proposal to CSC.

Data From BCS

While a CSC vice-president, Vincent Grillo, admitted his company had received information about the BCS bid, he said that information had come not from the city, but from a BCS sales employee, William Beagles.

Beagles had divulged the information over "several rounds of drinks" in a local restaurant, Grillo said.

According to the city's law department, this leak was passed on to the mayor's office by former Sen. Martin Durkin, now acting as the local counsel for CSC, in the form of a memo with derogatory comments on the BCS proposal.

This information was brought out during testimony before the City Council, which held hearings as a necessary preliminary to a final decision on the mayor's recommendation.

During the hearings, Grillo charged "BCS has deliberately introduced the appearance of evil into the process to either delay or destroy this FM procurement."

Although Beagles admitted to the meeting in the restaurant, he told the council "nothing privileged was discussed."

Elliott claimed he knew of no inatance of BCS proposal information being available to CSC and said that even if it was, it wouldn't have mattered since CSC submitted its full proposal a month before BCS did.

Both Bida Rejected

At the time BCS was informed of the apparent CSC victory, an offer was made to BCS to give it a bidders' debriefing on the evaluation and selection process, and weighting factors were released to both bidders following the formal bid opening last June, Elliot said.

After several weeks of City Council hearings, both bids were rejected due to "flaws in the competitive bidding process" and "attempts to influence city evaluators improperly."

The flaws, according to the law department, were a failure to publish an official notice requesting bids when a change of the original request for proposal was made and a lack of specifications in the city's request, whicb meant the two competitors were not bidding on the same project.

The "attempts to influence evaluators" charge referred to the apparent leak of the BCS proposal by Beagles.

BCS and CSC have collided previously over public sector contracts, Elliott contended, citing examples in nearby Pierce County and Newark, N.J., where BCS protested CSC contract wins.

"The protest of the selection and attempt to discredit the evaluation have become the hallmark of BCS' reaction to losing FM contracts," he said.

Once the controversy started with the City Council hearings, politicians began questioning whether a change in the current DP operations should be made at all.

"There is a cloud hanging over the bidding process and the evaluation," City Councilman Tim Hill, chairman of the hearings, said.

"Unless this can be cleared away, the council will have no other choice than to reject the bids and start all over," he added.

One of the "starting-all-over" options, Hill indicated, was giving up on FM and returning to a city- or county-managed DP center.

The city is now left with the options of examining the possibility of a joint city-and-county-managed facility, continuing with a city-managed operation or starting over from the beginning on an FM procurement.

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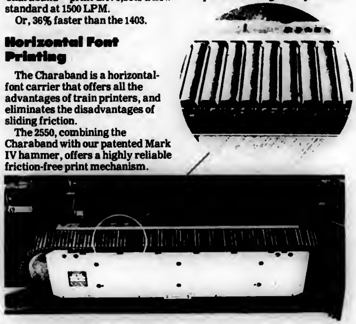

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Catamore, IBM Lawyers Joust in Court

(Continued from Page 1)

squarely faced. Brown's answer was that, through a series of convolutions, the case confused the jury.

Each time Pettine ruled straightforwardly, Thomas K. Christo, the attorney for Catamore, convoluted the issue, he said.

Using quotes from Pettine during the trial, Brown observed Pettine had warned Christo of the latitude granted him to tie issues together.

Brown charged items were not tied together. "The verdict is in error and is dead wrong. It should not be allowed to stand," he said.

Focusing on the issue of unrealized business as claimed by Catamore because of DP deficiencies, Brown attacked the profit projections, including new business ventures, presented by Catamore President Robert Catanzaro.

He called these unprofessional, and unreliable, being handwritten and of a general nature, which only occasionally took into account cash flow and financing.

Testimony indicated, he said, the projections were not used by Catamore, but were discarded.

Much of the Catamore trial focused on the admission of oral agreements between Catamore and IBM for systems engineering (SE) work. These were allowed as they were ruled separate and distinct to the written agreements for machine services.

Brown took issue with this ruling and also focused attention on the wording of an IBM letter telling customers they would be charged for SE services in the future. He stressed the wording made it clear the ultimate responsibility rested with the customer.

Rather than the $26 million figure indicated by Catamore in an exhibit, Brown said the maximum that could be awarded would be $6.2 million. A $12.5 million figure presented by Catamore was gross profits, included duplication of charges and "does not have the dignity to be considered by court, let alone jury," Brown said.

The result of the "profusion of confusion" presented the jury was that it "doubled what could have been perceived on any claims," Brown said.

It was "a general verdict, and one cannot factor out what a jury did wrong," he said. "The entire verdict is tainted by confusion [and] wrought by defendant overreaching," about which Pettine had warned, he said.

Brown implored Pettine not to take "the easy way out" and let the case go to the court of appeals, but to overturn the verdict.

"An important part of the responsibility of a judge is to judge the rightness of the verdict," he told Pettine, who "understands the extent of his latitude led to this unfortunate verdict."

Negligence Enough

Christo, responding, observed Brown's argument ignored the issues of fraud and negligence. "Even accepting all of his argument, negligence alone would support this verdict," he said.

Several matters on which Catamore had argued negligence, such as improper machine selection and lack of warning to the customer regarding the dangers in switching to an inventory system, were mentioned by Christo.

Turning to Brown's argument about damages, Christo argued the total "only came into play if the jury awarded punitive damages." He said his presentation made very clear there were duplicative items, which were there to demonstrate the different theories of liability.

"For compensatory damages we were very clear," he said, observing IBM had never previously made this objection.

"The jury could have chosen from available documents," he said, adding even an IBM witness had estimated $19 million as the bottom line for the elements Catamore claimed.

Considering the care taken in presenting the judge's charge to the jury compiled from the two attorney's charges, the length of the deliberation and the number of questions the jury asked, Christo said he felt the jury knew what it was doing.

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For Successful POS Implementation

Properly Prepare Customers, Employees for Scanning

By Nancy French
Of the CW Staff

TORONTO – Scanning terminals, the Universal Product Code (UPC) and an end to price marking can be successfully implemented if both customers and employees are properly prepared for the change, attendees at the Canadian Computer Conference were told here recently.

The advice came from Arnold M. Sobrian, coordinator of Project Point-of-Sale (POS) for Steinberg's Ltd., one of Canada's largest supermarket chains and the only one to implement a UPC scanning installation in this nation to date.

Last week's 18-month progress report emphasized that, while a lot has been accomplished, there is still a long way to go. Right now, a major problem is the fact that many food packagers have not yet begun to include UPC symbols on their products, he said.

Steinberg's installed an IBM 3660 system consisting of Model 3663 scanning terminals, with individual control units and a 32K 3651 minicomputer. Data gathered during the day's operation is retrieved each evening via auto call and processed on a 370/145.

CW In Canada

Rather than an over-the-weekend conversion, Steinberg's eased customers into the new system over a two-month period, Sobrian explained. As a first step, only two automated checkout lanes were opened. Standard mechanical cash registers were retained in the other lanes.

During this period, bag stuffers were distributed to customers explaining the benefits of the new system, he said.

Customers were and still are provided with grease pencils at the entrance of the store to mark prices on the items they select, if they wish, he said.

But few are bothering to do so because they have confidence in the scanning mechanism. They've tried it, and it works, Sobrian indicated.

CW Photo by N. French

Arnold M. Sobrian

As part of their introduction to the scanning machines and an end to price marking, shoppers were invited to scan some items themselves on a scanning device set up in a booth at the back of the store, he said. A store employee was stationed there to explain the advantages of the system.

After one month of partial automation, the entire store was converted. By the end of the second month, price marking was discontinued.

By the time the store was fully converted, few shoppers expressed dissatisfaction with the system, and sales figures indicated few discontinued shopping at Steinberg's in favor of competitors that have yet to automate, he indicated.

"Active employee participation in every stage of the [system's] installation" was also a key factor in making the new operation a success, Sobrian said.

In the planning stage, employees were briefed on system objectives, he said.

Store employees also helped formulate operational procedures and design supporting equipment.

Labor Relations

Employees' unions were notified in advance during the course of decision making, and educational sessions were held for union representatives, Sobrian said.

Even now, however, after 18 months of operation, the system has not brought about cost savings or gains in productivity expected for several reasons, but it is coming, he said.

We found the most significant improvement in productivity occurred where 70% to 80% of products being checked contained the UPC code, he explained.

However, since only 45% of Canadian products are marked, this necessitates costly symbol marking of 35% of the store's merchandise with Toledo printers, he said.

Further, checkers have been slower than expected in attaining promised speeds.

"But the equipment works and very reliably," he said, adding that in 3,500 hours of operation, the store in Dorval had only two hours of downtime.

When the controller in the store does go down, the store manager restores service by tying his checkstands into a controller at another supermarket 350 miles away.

With it, the new system has brought increased accuracy.

Up-to-date item-movement information through telecommunication linkups provided by the system offers the advantage of better and quicker reordering and avoidance of "stock-outs," he said.

More efficient price monitoring and general control by headquarters ensures matters of chain policy are followed, he said. This assures that local store customers get the benefit of nationally advertised sales.

Once employees are relieved of the need to price mark store items, they can place more emphasis on shelf marking, which actually provides far more information than the price marking on the item itself, he said.

In addition, more detailed information on the customer cash tape will enable more effective handling of customer claims and discrepancies, a benefit to both the supermarket and the customer, he said.

Finally, control of pilferage through comparison of items sold with items moved is certainly another advantage.

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DBA Job Too Big for One Person; Team Concept Urged

By Nancy French
Of the CW Staff

TORONTO – Data base administration is too big a job for one person – the team approach makes more sense, A.H. Cassidy, senior data base administrator (DBA) for the University of Toronto, told the recent Canadian Computer Conference here.

While the specific functions performed by the DBA vary from installation to installation, the DBA is ultimately responsible for the "now-recognized resource of data," he said.

The DBA must perform maintenance of the physical data base data sets, including backups, physical reorganization and relocation of the data base, definitions and the data dictionary, if one exists, he said.

The DBA also controls the security system and monitors and tunes overall system performance.

Finally, he often consults and advises others on data base and program design and training of programming staff.

"Such a pivotal function must be adequately staffed," Cassidy said. Management must avoid the temptation to do the job "on the cheap" and turn the DBA function into a one-man show.

In the earlier stages of an installation's development, the DBA function can be split among existing organizational units, Cassidy suggested.

"This works well with systems in the batch-only stage," he said, "since the number of central functions is small and can be handled by existing personnel."

But with the addition of teleprocessing, with its inherent security problems, the need for a central coordinating function increases "drastically."

The best approach is the formation of a DBA group, consisting of the DBA and staff to carry out the necessary functions. This is the most effective option but often is not attempted because of a perceived high cost, he explained.

The DBA function at the University of Toronto, evolved over a five-year period, Cassidy said.

At first, the DBA function was split between the software section and the managers and supervisors of the various project teams.

CW
In Canada

Toward the end of the batch-only period, when some systems were developing teleprocessing applications, some of the problems associated with central needs began to be felt, he said, and the assistant to the director became involved in a coordinating, quasi-DBA role.

As teleprocessing applications became operational, however, the department was reorganized and three positions were established – one senior DBA plus one technical specialist in student information and another in business affairs information.

Although the two "junior" DBAs do not report to the senior DBA, they work in concert.

The two junior DBAs took on all the DBA tasks formerly executed by the managers and the supervisors: the senior DBA coordinates and carries out certain "central" tasks. The entire DBA group meets on a weekly basis to discuss matters of general concern, he said.

University Adds 'Door' To Make IMS Secure

TORONTO – The standard security provision available with IBM's IMS, although probably adequate for most endeavors, lacks a fine detail necessary in the university environment, A.H. Cassidy, senior data base administrator for the University of Toronto, told the Canadian Computer Conference here recently.

Standard security usually permits access for inquiry or update at the data item level so that if a particular user is to be permitted access to a data item, such as student's course mark, that user is effectively permitted to access all occurrences of that data item – all student course marks, whether or not the students are his.

In IMS, security can be compared to a series of "doors" which must be opened in order for the user to have access to the data, he said.

Some doors are physical, such as the security keylock on the terminal, while others are unlocked via predetermined procedures.

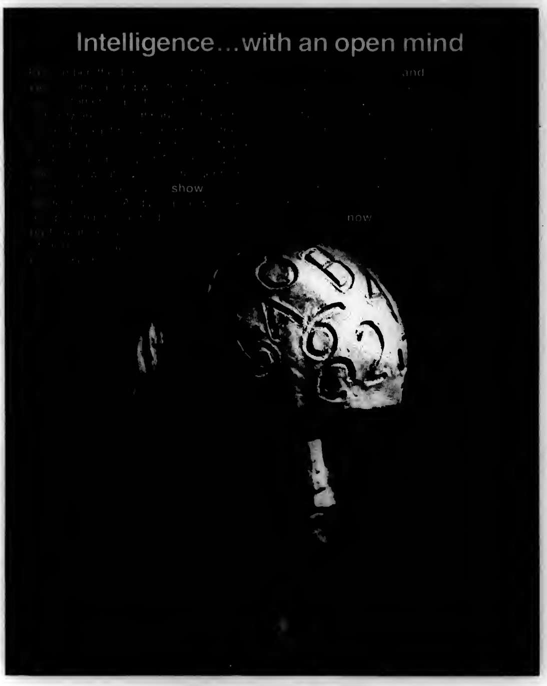
Security at the date item occurence level can only be implemented within a particular application because of the complexity of the security policy.

To fill this need, the University of Toronto decided to add another "door" to the security scheme and provide whatever central services were possible to aid each application group in implementing this kind of security, he said.

The central components included a security data base to serve as a repository for the application-oriented data and parts of the teleprocessing interface routines to access and store that data, he said.

The application system manager, working under an established policy, determines the data to be recorded for each logical terminal and communicates this via the DBAs terminal to the master terminal operator, who records it on the security data base.

Simultaneously, a security check routine is installed in the appropriate programs. At the time of the input transaction, the security information is accessed by the teleprocessing interface and provided to the user program, which uses the application's security check routine to determine whether this transaction should be passed or not.



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To Make Intelligent, Informed Decisions

Congressmen Finding Data-Accessing Techniques Vital

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – According to columnist Art Buchwald, senators and representatives decide whether to vote yea or nay on a bill by reading *The Washington Post*.

Other observers here contend it's a congressman's aide who clues him in.

Computers At Work In Government

Whomever one chooses to believe, it is clear the lawmaker who tries to stay abreast of today's critical issues in enough depth to make an intelligent, informed decision is faced with a full-time research job.

The average congressman has suffered from the same myths and misconceptions about computers that plague John Q. Public. While the Executive branch – for which Congress is mandated to "check" and "balance" – has amassed some 7,000 computer systems for use in decision-making as well as administrative chores, the House, Senate, Library of Congress and Government Printing Office have only seven systems altogether. Information gathering here is done through the traditional hearings process and written reports.

The General Accounting Office, the arm of Congress responsible for overseeing the operation of the Executive branch, doesn't even have a computer. It chooses instead to piggyback service when time is available on Capitol Hill systems.

Recently, however, led by North Carolina Rep. Charles Rose, a second-term Democrat, congressmen are being pushed into the computer age to help manage the information explosion that has made their jobs so difficult.

Clerk Allowances

Rose, who learned the value of computers in the North Carolina state government's Department of Administration, where he used them to help prepare the state budget, is convinced the information explosion can be managed with the application of computer power.

As chairman of the House Administration Committee's Ad Hoc Computer Subcommittee, established last March, Rose recommended members of Congress be given the option of spending up to $1,000 from their clerk-hire allowance each month for computer services. The Senate purchased 100 terminals for whoever wanted one.

Although reluctant at first, now more than 40 representatives and 70 senators have CRTs and printer terminals installed in their offices to take advantage of the computerized information provided free by the Library of Congress' Information Systems Office (ISO).

Some are even subscribing to information services offered by the *New York Times*, Lockheed's Computerized Information Retrieval System and Systems Development Corp., according to Neal Gregory, executive director of the ad hoc subcommittee.

Since a terminal rents for about $200/mo and the Library of Congress' computerized information system, known as Scorpio, is free to members of Congress, sufficient funds remain to subscribe to outside information services which range in price from $25- to $125/hour, he added.

But Congress' old ways of doing things can't be wiped out all at once, according to Rose. Instead "you have to waltz in slowly," develop a track record and win its trust.

Congress is now developing several computer systems of its own for three key functions: basic information retrieval, such as bill status; constituent services and word-processing functions; and federal budget monitoring and control, Gregory said.

The new budget committees and the House Budget Office, created by the Impoundment Budget and Control Act, are all getting heavily involved with computer systems. They are adapting executive department data bases for their own needs as well as contracting for outside econometric modeling services from organizations such as Chase Econometrics, Data Resources, Inc. and the Wharton School, he added.

Already in operation in the House is a financial management system, run on an IBM 370/145, to handle payroll for the 698 separate employers – members and committees – on Capitol Hill. It also updates bill status on a daily basis.

Last year, the House put into operation an Electronic Voting System to record the entire House vote without the need for a time-consuming formal roll call.

Driven by two Control Data Corp. 1700s, the system incorporates voting stations that identify each member by his perforated identification card and provide buttons by which he may vote yea or nay after being identified by the system.

It also features a scoreboard and two terminals so clerks can get a breakdown by party, geographic area or other category.

Budget System

Still under development is a Budget Information System that will be made available to members in a kind of "situation room" at the Capitol.

According to Gregory, this system, which is patterned after the one used by the legislature in the state of Washington, would make budget proposals made by specific pieces of legislation available in the form of charts, graphs and other easy-to-digest formats.

If a legislator wants to know the trend of expenditures for medical assistance, for example, he can obtain figures on past expenditures as well as future projections from budget data in the situation room, Rose explained.

Once a good system of data information is developed, "chairmen of appropriations committees will no longer be able to tell members that such-and-such amendment will have far-reaching effects that cannot be readily determined. Members will be able to find out for themselves," Rose said.

Some day, Congress will be able to monitor expenditures made in Executive departments to assure instant accountability, he contended.

Every time an Executive computer writes a check, congressional computers would be notified, he said.

With these kind of checks and balances, Congress will always know what the Executive branch is doing with the "taxpayers' dollars."

Library of Congress Operating Seven Data Bases

WASHINGTON, D.C. – The Library of Congress' Information Systems Office (ISO) is operating no fewer than seven data bases that provide information on-line under the curious name of Subject-Content-Oriented Retriever for Processing Information On-Line (Scorpio).

Of these data bases, the three most important are the Major Issues File and two separate Legislative Information Files – one for the 93rd and a second for the 94th Congress, according to Neal Gregory, executive director of the House Administration Committee's Ad Hoc Subcommittee on Computers.

Using a custom-designed, English-like vocabulary of four-letter words, members can retrieve from the Major Issues File a 10-page brief on any one of nearly 200 topics ranging from abortion and aging to waste disposal and world population control, Gregory explained.

The file also contains a list of any hearings on each subject as well as all pending legislation and any data on the matter available through the Library of Congress, he added.

The Legislative Information File gives a congressman or member of his staff a digest of each bill plus a 100-word factual description of it and the date it was introduced on the floor.

Also available are names of sponsors, what committee has been assigned responsibility for a bill and its status.

Legislative information is available on-line within 36 to 48 hours after action since its source is the *Congressional Record*, which itself lags Congress by 24 hours, Gregory explained.

The fourth data base is the National Referral Center Resources File, which contains 10,000 descriptions of organizations qualified and willing to answer questions or provide information on science, technology and social science issues.

For example, "if you key in the word 'refugees,' one can find six different organizations that can give expert information on refugee problems," Gregory said.

Fifth is a Selected Science and Technology Reference File which consists of a bibliography of 90,000 references in science, technology and library science from the Library of Congress catalog.

Sixth is the Bibliography Citation File, a list of articles from significant periodicals and pamphlets, Congressional Research Service reports and similar materials which are also available in hard copy from the library.

The ISO requires the power of two 370/158s, one dedicated to batch processing and the second to teleprocessing functions, to service Scorpio, the library and Congress' other cataloging needs.

According to Bill Nugent, assistant director for information systems development, the systems use 40 spindles of mixed-vendor, 3330-type disks, containing 500M bytes of storage.

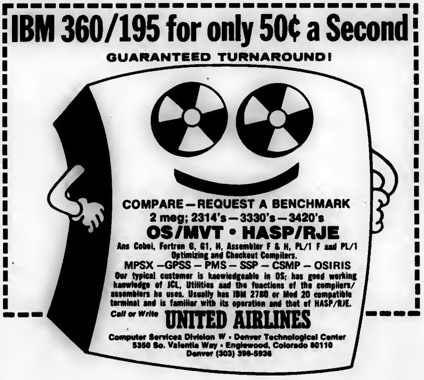
Audri Planned for Drug Overdoses

PASADENA, Calif. – The automated drug identification system (Audri), developed at the California Institute of Technology under government contract, is planned to meet the growing challenge of treating those endangered by drug overdose.

The system permits a quick analysis of blood or urine samples and is capable of identifying 100 commonly abused drugs, according to the National Aeronautics and Space Administration.

A computer controls the entire analytical process by ordering various steps in specific sequences.

Data is sent to the mainframe for comparison with information on standard drugs. If the comparison results are positive, results of further analysis are sent to the computer, which then prints out the names of the drugs identified.



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County Punches In-House, Processes at Private Site

By Nancy French
Of the CW Staff

Computers At Work In Government

GRAND RAPIDS, Minn. – With too low a daily processing volume to justify its own system and the nearest service bureau 80 miles away, Itasca County officials found themselves in a bind when Carlton County could no longer accommodate their DP needs on its system.

Itasca County solved the problem with a little help from Blandin Paper Co. here, according to Robert Loscheider, Itasca County auditor. The solution, he said, was to bring job setup and keypunching in-house and buy computer time from Blandin.

Still working this way five years later, the operation has been so successful four other nearby counties have also singed on with Blandin, and all are patterning their systems after the one Itasca developed.

Itasca's data processing activity is not only rather novel for a government operation, it is also very low-budget, according to Loscheider.

Itasca's data processing budget for 1974 totaled $42,500. This included salaries paid to one programmer, one full-time keypunch operator and one half-time keypunch operator.

The $42,500 figure also included funds for paper supplies and 15 hour/mo for computer time by the clock. Cost per capita for Itasca's 38,000 residents was $1.12, Loscheider said.

Four Functions Automated

The county has computerized four principal functions: accounts payable, payroll, the highway department's road and vehicle costs and real estate taxes for 16 cities, 41 organized townships, 38 unorganized townships and five school districts, Loscheider said.

Programmer Linda Taylor, who heads the data processing effort, writes all code, sets up daily jobstreams, supervises the keypunch operators and distributes all reports after processing.

In addition to her responsibilities for Itasca County, she oversees data preparation for Chipawa and Yellow Medicine counties, both just beginning to computerize.

The tax program is one big file-editing problem, according to Taylor. "We load all market values, land splits, sales and changes in name and address of landowners for each assessment district all year long."

Then, once a year, "we calculate taxes on the computer." This information is used to "compile a taxbook for county officials as well as printing tax statements for each parcel listed," she said.

Taxpayers get two statements – the first on May 31 and a second on Oct. 31.

As receipts trickle in, they are posted and taken in for processing daily, she said.

In addition, about 10 different tax data abstracts are prepared for the state.

Payroll and accounts payable are run every two weeks.

Recent changes in the state's tax laws have radically altered the way taxes are calculated, and many of the existing programs have to be totally rewritten this year, Taylor said.

In particular, the "circuit breaker" which links the amount of real estate taxes an individual pays to income has added greatly to the tax collection workload, Loscheider explained.

All processing is done in batch mode on Blandin's IBM 370/125 at a cost to the county of $130/hour. Turnaround time is generally 24 hours, according to Doug Englehart, Blandin's DP manager.

The $130/hour rate includes time, hardware, the operating system, an operator and disk space for files and programs, he said.

Englehart was quick to explain, however, that Blandin is "not in the service bureau business" as such. "We're just trying to cover some of our overhead," he said.

"If we were in the service bureau business we couldn't afford to offer these rates," he said. On the other hand, however, "if we didn't do this, we probably couldn't afford the computer we have either."

The 125 has a 162K CPU and 70M bytes of disk storage.

Like Blandin, Itasca County has adopted PL/I as its programming language. This has permitted the county to take advantage of many of the library routines Blandin is using at no extra cost, Englehart noted.

AUSTRALIA

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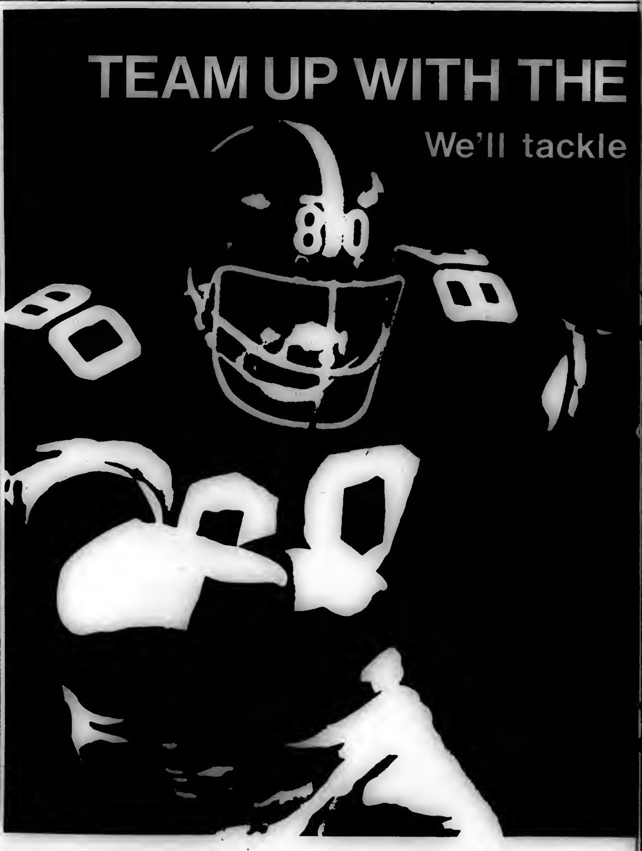


For County Tax Purposes

System Maintains Assessment/Market Value Ratio

By Nancy French
Of the CW Staff

Computers At Work In Government

NORRISTOWN, Pa. – The Montgomery County Board of Assessment has developed a system here to keep the assessment of all residential properties in the county at a rate constantly proportional with their market value at any given time.

The system is geared to eliminating the need for regular physical reassessment, as well as making property taxes as fair and equitable as possible, William Wentz, Assessment Board chairman, said.

At the moment, since the county is in the process of selecting and installing a new central computer system, this program is being processed on Honeywell equipment by Worlco Computers, Inc., a nearby service bureau, he said.

The master file, on the other hand, is being maintained temporarily on an IBM 370/125 at Montgomery County Community College, Wentz said.

All administrative updates, such as changes in ownership as well as improvements and additions, some of which are based on building permit information, are furnished to the service bureau where they are keypunched and stored on magnetic tape.

Once a month these tapes are sent to the community college DP department where they are changed from 7-track to 9-track format and added to the master file, which is stored on disk for access through CRT terminals at the Assessment Office.

The master file contains about 165,000 residential properties, which are accessible by parcel number or by recorded deed book and page number, Wentz said. Each record contains the owner's name and home address as well as details about the property such as the amount of living space in square feet, number of bathrooms and garages and number of stories, as well as assessed valuation and market value at the time of the last assessment, he said.

To keep assessment value up to date, "we look at all sales of comparable property and adjust the value attached to the various characteristics of a property in line with the new sale prices," DP Manager Don Cunningham said.

The goal is to keep the ratio between the assessed value and the market value of all properties in the county at 33.3%, John Deitch, Wentz's assistant, said. At the moment, "our average is down around 19% or 20% because of inflation and the fact that some properties haven't been reassessed in some time, he said. One final countywide assessment will be needed before the system is adopted.

This unique system was designed here after county officials, "scouring the country" for a suitable system, came up with nothing they could adapt to their needs.

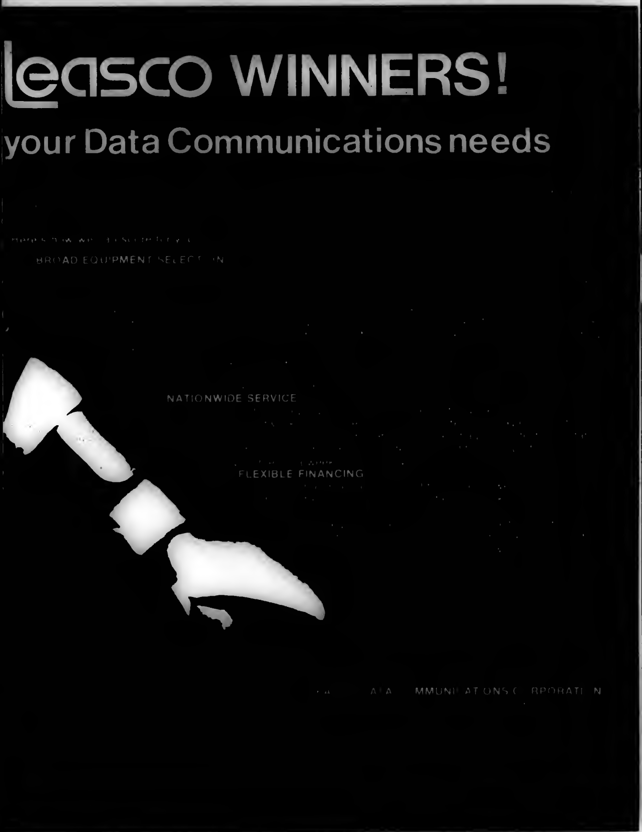
"Most places are using fancy statistical programs such as multiple regression analysis that ordinary citizens and most of the users, in fact, can't even understand," Wentz said.

When it is installed, the entire system will be maintained in an on-line interactive environment, and all administrative changes as well as massaging will be done via the CRTs in the Assessment Office.

The county is just in the development stages of bringing up a similar system to handle commercial and industrial property.

The programs are all written in Cobol, the language adopted by the county for all its DP activities, Cunningham said.

THREE STRIKES YOU'RE OUT!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Editorials

Bridging the Gap

The Association for Computing Machinery is to be congratulated for an ACM '75 program appealing to a wide membership.

In addition to technical sessions attended by standing-room-only crowds, the conference also forged ahead with the theme "the quality of life," offering several sessions that focused on the contributions computer professionals can make toward that goal.

ACM is to be lauded for its efforts to get membership to look at issues that are not industry specific, although the adage, "you can lead a horse to water, but you can't make him drink," seemed to hold true.

The sessions on computers in electoral voting, public policy and such were there, but were sparsely attended.

One item that perhaps highlighted most poignantly what might be interpreted as the self-imposed isolation of the DP community occurred at an ACM first — an evening entertainment hour.

At SigElbow cocktail hour, an improvisational group performed skits which either used input from the audience or were created by the troupe and reflected the public view of computing.

Although nearly all scenes drew hearty laughs and applause, it was nevertheless evident there is a gap between the general public — the performers — and the DP community.

The troupe managed to throw out a few buzz words and to incorporate some audience themes into skits, but their representations of DP situations or future everyday life as influenced by DP were often rudimentary.

The audience laughed at this different level of understanding almost as often as at good lines. Some of the skits could have been hilarious if the troupe had hit the mark more often using "in" remarks in appropriate situations.

But the fact the audience could appreciate the chasm between the entertainers and itself confirmed the belief that the DP community will recognize the gulf and build a bridge.

Perhaps focusing on specific areas where DP expertise is needed in the public domain, such as at the sessions on the quality of life, would be a good place to start.

Through the skit ACM leadership may have found a medium for its message to members more effective than the "public interest" sessions alone. Perhaps next year there will be more interest in such sessions.

Privacy Act Abuse

It seems some government agencies are trying to use the recently enacted Privacy Act of 1974 as an excuse to withhold information from private citizens and the press.

Computerworld recently contacted the Internal Revenue Service (IRS) in connection with the investigation of an article. The information requested pertained strictly to technical matters, specifically computer programs of the IRS, not to the tax returns of any individual.

The IRS, however, said any disclosure of this type of information would violate the Privacy Act.

However, the IRS was in fact violating the Freedom of Information Act.

If official agencies are indeed going to use the Privacy Act as a scapegoat or as an excuse to conceal unconfidential information, the industry and citizens alike may have to ride herd on the interpretation of the act.

'Don't Look Now, But I Think You're Also Being Followed.'

Letters to the Editor

Negative Editorial Policy on IBM Tends to Destroy CW Credibility

Computerworld's completely negative editorial policy toward IBM, coupled with its prejudiced reporting on IBM matters, tends to discredit all of its other articles and certainly destroys much of its credibility for accuracy.

Why doesn't CW smarten up?! IBM isn't all bad. Sure, any large company has faults, but it has made a tremendous contribution to our field, and everybody in the trade knows that.

William E. Berry
Montvale, N.J.

Responsible Analysis Wanted

I'm beginning to think a newspaper which adopts the tabloid format evolves to a like mentality after reviewing *Computerworld*'s issue of Oct. 15.

The lead story ["IBM Planning Attack on Antitrust Judge?"] as well as the first-page coverage [Course of Telex vs. IBM Shaped by Personalities] establish my case. What is clear is that IBM has submitted an appeal document and it is likely in connection with Judge David N. Edelstein's denial of IBM's request for preinterview.

To speculate that this is an "attack" and "as some rumors seem to indicate, the firm may well ask for his removal" is contrived journalism.

As for the Telex vs. IBM material, CW's position becomes clear in explaining that the appeals court decision was a function of "rolling out ex-Attorney General Nicholas P. Katzenbach to make a presentation to the judges, several of whom were appointed while he was in the Justice Department."

As a user manager who has installed a fair number of competitor's computing systems, I know full well the intensity and near intimidation of *the* computer company. To this end I expect, from the weekly issue, responsible analysis of key management, hardware, software and communications issues.

It serves no useful purpose for CW to compromise the essential reporting in the above-mentioned areas with the notions of its editorial staff.

David W. Delaney
Germantown, Md.

No Problems With Hardware

In the letter from Ed Tunstall [CW, Oct. 15], it was difficult to get a real feeling for his problems.

We installed a Hewlett-Packard 2000F time-sharing system June 1, 1972 (about 29,764 hours ago). All downtime comes to about 185 hours – preventive maintenance (about five hours every three months) 70 hours, power failures 15 hours and hardware and software problems about 100 hours.

Our system runs 24 hour/day, seven day/week. Our single biggest problem is the aging of lamps used for position control in the disk drives. They need to be replaced every nine to 12 months. Otherwise, the system just runs and runs and runs.

Oh yes, our console running 24 hour/day has given a few problems. When this occurs, we simply plug in a terminal to use until the console is repaired. We once ran for two days without a console.

Our service comes from Atlanta, Ga., about three hours away. This does not bother us either. We once thought about an uninterruptible power supply when power failures were occurring every 15 minutes. However, our only problem with power failures is the slow system clock.

All of us take the system for granted. Most of our users don't know what the terms "system down" or "crash" mean.

Fred W. Stone
Manager, Computer Center
School of Engineering
Tuskegee Institute, Ala.

NCR's Newer Equipment Improved

Having been a user of NCR equipment for over five years, I feel Ed Tunstall's letter was pretty harsh, and I hope its effects will help to gain better support in his area.

His equipment was first released by NCR in 1968. Since that time NCR has released newer and better versions of processors and peripherals.

We originally installed a Century 100 and, although we didn't experience one-quarter of the problems Tunstall has experienced, we have found that since our upgrade to the Century 101 we have experienced only one major problem on this system. This amounted to downtime of only one day in a two-year period.

To express our confidence in NCR and its hardware, we have just recently purchased our system due to the expansion capabilities now offered with the C-101.

I sympathize with Tunstall because, during my past 12 years in the DP field, I have experienced similar problems while working with IBM hardware.

J.E. Leeson
Lansdale, Pa.

(Other letters on Pages 16, 17 and 20.)

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Letters to the Editor

Personal Experience Insignificant Sample

As a woman and DP professional for eight years, I strongly object to the ideas expressed in the commentary irritatingly headlined "Women Don't Want Promotions" [CW, Oct. 15].

Wolfe's first point was women don't make as much as men since their length of service is shorter than men's. As proof he cited his own personal observation of the species, "women programmers." This is an excellent example of how deep-rooted stereotypes of women are.

As a professional in a statistical field, Wolfe must know that any sample drawn from his personal experience is not statistically significant when dealing with the large population of women in DP.

As for women's reasons for leaving jobs, I have known men who quit for every one of his reasons (except maternity, of course).

Wolfe's next point was most women don't want to be promoted to managerial positions becsuse of the added demands on their time. Again we are offered only Wolfe's experience to back up this contention.

Pretending to know the motivation of a whole class of people, ss Wolfe did, is only a facile rationale for excluding that class from consideration when promoting. If this isn't discrimination, what is?

Wolfe's last point that fewer women than men apply for programming positions was inconclusive. What is of interest is how the ratio of men to women changes when progressing from job applicant to employee hired to employee promoted. This is the statistic that must be carefully examined.

Wolfe tried to dismiss charges of discrimination by appealing to the very stereotypes that cause it. I'm afraid he's part of the problem.

Carol Christiaanse
New York, N.Y.

Same Applies to Males

In Jack M. Wolfe's commentary, "Women Don't Want Promotions," I was surprised to find that age-old reference to women (who have) "resigned when their husbands' employment changed to another city," forgetting that in all probability the husband resigned at one company to accept that position with another company in another city.

Another age-old reference was to women's maternity leaves where, again, no comparison is made to the typical "lost days" of the male employee.

Further, one wonders which statistics Wolfe used when he made statements such as, "The average period of employment of women programmers is noticeably less than that of the men." All of the evidence I have seen pointed to the contrary, and even *Computerworld* reported in the same issue ["Management Problems Promoting Women Self-Imposed"] "statistics from the Department of Labor showing the average length of service by women is comparable to that of men."

Barbara McLean
Los Angeles, Calif.

Left Out!

After worthless delays and a very clear indication of low-priority regard, the Ford administration finally named a gaggle of second-rate bankers, plastic-money executives, and root cellar professors to the EFTS commission. Electronic Funds Transfer, when it gets really rolling – and you can bet your privacy the Big Buck Boys will see that it does – will consume 'way over a billion dollars worth of computers and data communications gear and hundreds of millions of dollars worth of hardware and software security packages. So naturally, not one single person with even the very faintest hint of technical knowledge was named. Considering that Ford's predecessor, the lamentable King Richard, put the boots to his own science adviser, I support we shouldn't be surprised. But gee! I would have been happy to have even had the manager of the Grand Rapids IBM office on the commission. True, he would have outranked most of the other appointees, but better a Friendly Local Salesman than a deputy – *deputy*, yet – New Jersey banking commissioner.

Here everyone clearly recognizes the beginnings of the most dangerous embodiment of 1984: a worldwide net of financial transaction records that will enable the block-by-block, minute-by-minute surveillance of every credit-happy American. Even the notorious Republican indifference to consumer protection might have been expected to waver a little in the face of such a Frankenstein monster! Putting aside human rights as being unrewarding in an ITT society, and loathing Naderites with a passion, one would nevertheless have expected Ford at least to appoint a couple of Uncle Toms; Dick Simpson types abound in today's Washington. But no – one hundred percent grinders of the public face!

But surely even *bankers* know about embezzlement? A wide-flung money net offers the most unbelieveable opportunities for incursions – doesn't anyone want an expert? Oh, I know; get Donn Parker to testify and manipulate his warnings as appears most economically and politically astute at the moment. But this is not a minor little system that can be revised in a few months after the first scandals.

My own idea would be to pit the greedy electronics men against the greedy bankers and the antediluvian lawyers; they will want layer upon layer of expensive security and, with some part of their product in place, a later generation of outraged consumers – our present one is too numbed – can set up privacy devices quite easily. First, you need locks; you can change the combination and restrict access later.

Given time, we might have got a good scrap going between the department stores, the banks, the Federal Reserve, the plastic-money menaces, the Ross Perots trying to set up fresh networks, the ITTs and RTWs, and giant IBM. While the monsters battled for the consumer's carcass, we might have arranged, if not an escape, at least private burial. Alas! Too late!

Probably we can look to a few of the states for help; Democratic or populist or just plan cantankerous – hello, Governor Brown – they still offer some regulatory protection. The state civil liberties outfits offer some regulatory protection. The state civil liberties outfits ought to forget the other kind of capital punishment and get to work.

Herb Grosch

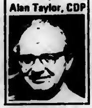
Credit-Card Crediting Method Can Penalize Customer

A Richmond, Va., reader recently had a problem with his credit account with Sears Roebuck and Co. He discovered a system flaw, in that the company bills using descriptive billing on a monthly statement, giving the customer about three weeks to pay without incurring a finance charge. So far, so good.

The Taylor Report

By

Alan Taylor, CDP



But, he pointed out, it took him six weeks to even get an answer to an inquiry through normal channels and, in the meantime, he was assessed a finance charge.

This reader has other problems with the answer, so I won't go into the details of his case this time, except to point out that he has put his finger on a system flaw that lies at the heart of many computer billing systems – the concept that a credit is simply a reverse debit. It may have been at one time, but it certainly isn't so now.

Finance Charge Changes

The major changed circumstance that has stopped the mirrored-debit credit systems approach having validity is, as the reader pointed out, the finance-charging methods that have been recently introduced almost everywhere throughout North America.

Until recently, the finance charge was based upon one single parameter such as the average daily balance or the balance outstanding at the end of a cycle.

Items did not attract finance charges until they were billed and time had been given for collection.

It wasn't a simple system to handle, but at least it could be handled. Crediting interest as well as original charges was computable just from the credit memo. Now it isn't.

Under the currrent system, it is difficult to compute interest refunds. Under the new system, finance charges are assessed differently for purchase made, billed and in their first collection period, depending upon some outside factor. Normally the selected factor is whether any balance existed at the previous due date, but others are used.

Two Categories

From this point, customers are separated into two categories, first-class customers who had no outstanding balance and second-class customers who had some outstanding balance – even if it was only a few cents. Second-class customera are charged finance charges based upon longer time periods (say from billing date or even from original charge date) than first-class customers.

For instance, someone may be charged for a wall mirror and a round-trip ticket at $120 in Month 1, then issued a credit memo for $60 when half the ticket is not used. If the credit is not reported to the system before the due date, from Month 2 onward, that customer will become a second-class customer for all purchases, not just for the $60 lost credit.

At first sight it would appear the second-class category would vanish when the delayed credit appears. But that doesn't always happen, as the wife of another reader, Professor Albert S. Dexter of British Columbia and McGill Universities, found out.

In her case, the $60 refund was issued in April, but didn't find its way into her charge account with the Royal Bank of Canada until August.

But the real danger turned up in September, when the system not only continued to charge the interest payments for the intervening months, but also started charging interest upon the interest. (The Dexters had carefully cleared their account month by month except for the delayed refund and the appropriate interest charges.)

In short, as the system stands today, a delayed credit can put a customer into a permanent second-class category, unless he elects to pay finance charges he shouldn't have been charged in the first place.

Airline Chaos

In talking to the Royal Bank about Professor Dexter's case, I found, not to my surprise, the airline industry is a particular problem with regard to late credits.

Not that it appears to be deliberate – apparently their systems are so fouled up the bank finds charges made in its own Montreal head offices (where some airlines have rented space) taking months to return to the charge systems.

What did surprise me however was they had come up with a solution to the problem of getting credits promptly into the hands of the customer, although at the moment it is operating only with a single airline, Air Canada.

Air Canada, instead of issuing a credit memo to a charge customer, now gives him a check made out to the Royal Bank for the amount. It's that simple. The check is restricted to the Royal Bank itself, and, of course, can be used to pay off the monthly statement of the original charge when it comes.

The system works for the bank, the credit-card company, the airline and the customer. And it does the required job of handling credits on a priority basis, so the system flaw in current mirrored-debii credit treatments is avoided. Congratulations, Air Canada and Royal Bank for a good bit of initiative.

But is still doesn't solve the general problem of credit handling when the refund is delayed over two periods.

As far as I can see, to really compute these charges backwards, the account has to be recomputed item by item, payment by payment, billing date by billing date to find out the proper finance charges.

Yet I don't think such detailed reconstructions are either being performed or are justified. So, who has solution? Should the restricted-check syatem become a general one? Is there any other way of automatically handling credits other than by the mirrored-debit systems? I'd like to know if there is one that fits current finance-charging practice.

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Reader Commentary

Use of Assembly Line Concept Can Speed System Development

By Edward R. Zujko

Special to Computerworld

In today's rapidly changing business climate, users cannot just sit and wait for two or three years for a new system. If a system is worth developing, then it should be done now.

But the Systems Department uses essentially the same approach it used 20 years ago and, If anything, development time has grown even longer. It's time for Systems to review its own procedures and to develop better methods for statisfying users' requirements.

Today's system is developed in much the same way Swiss watchmakers used in making handcrafted watches over 100 years ago. The senior analyst carefully studies every aspect of the new system and oversees every detail of its development. Apprentices learn the trade by working under the senior's direction. The finished product is a monument to the analyst's skill and workmanship.

Well, today's watches are produced on an assembly line much faster and better than ever before. Similar improvements can be made in the Systems function!

The assembly line concept can be applied to any task that can be divided into smaller, less complicated ones. To this division, standards must be introduced so the pieces can be fit back together easily. If that can be done, then the individual tasks can be farmed out and worked on simultaneously.

In Systems, the design of input requirements, file specifications, manual procedures, operating specifications, control procedures and daily, weekly and monthly reports are all tasks that can be performed simultaneously as soon as the main design has been selected. Similarly, other individuals can take over and work on the programming, testing or implementation stages.

As a result, all available manpower resources can be assigned to one project and the development time can be telescoped into a four- to six-month period.

Other Advantages

There are many other advantages to be achieved by changing the workflow:

- Increased productivity would result from standardization and variety in work assignments.
- A dynamic and stimulating working environment would be created.
- This would provide. an excellent environment for training and development.
- It reduces the risks associated with dependence on key people.
- The chances of specification changes in midstream are reduced.
- The manager has better control of costs and schedules.

The transition to an all-out effort on one system at a time can be accomplished smoothly. Progressively bigger teams can be assigned to new projects and responsibility for major segments of the system can be assigned to different individuals. At the same time, the due data can be advanced.

The real test will come when it's time to make the final decision. Systems people have become quite skilled at overcoming resistance to change. Will they be able to work the same magic on themselves?

Zujko is DP manager at Green Giant of Canada.

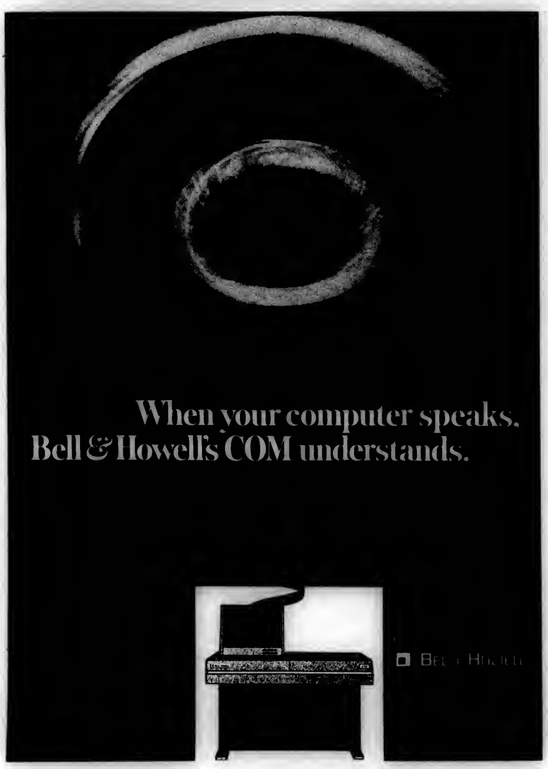
Letters to the Editor

Report on DBMS Available

In the Special Report on data base management systems [CW, Sept. 24], Don Leavitt referred to the National Computing Centre publication *Data Base Management Systems: User Experience in the U.S.*

Readers may be interested to know this report can now be obtained in the U.S. from Hayden Book Co., Inc., 50 Essex St., Rochelle Park, N.J. 07662.

Brian Davis
National Computing Centre Ltd.
Manchester, England



Letters to the Editor

Times Project Addendum

Having seen a continuing stream of letters concerning the New York Times Information Bank project, I would like to try to resolve some of the confusion.

Much of it began in the June 4 *Computerworld* article, "Rules Not Helpful All The Time," in which CW innocently attributed some of my remarks in a National Computer Conference panel discussion to Prof. Peter J. Denning (who, to the best of my recollection, expressed no opinions whatsoever on the aforementioned project).

Subsequent to that article, there have been angry letters from F.T. Baker of IBM [CW, Aug. 13] and Stanley Kaplan, Harvey Morgenstern and Bob Blumfeld of the *New York Times* [CW, Sept. 17 – not to mention a rash of private correspondence and phone calls in which everyone tried to figure out who said what to whom.

Kaplan, Morgenstern and Blumfeld had a valid point in their letter: Since I had not worked on the project, I should not have made any public comments concerning it. To the extent that I may have distorted the situation or insulted either the developers or the maintainers of the system, I certainly apologize; to the extent that CW further garbled the situation by associating the remarks to Denning, I think some apologies are in order.

However, I think the incident should be viewed in a different light. Everyone is interested in the *New York Times* project, since it appears to be a "classic" case study of successful use of top-down implementation, chief programmer teams and structured programming.

Shortly after publication of Baker's initial paper on the project ("Chief Programmer Team Management of Production Programming," *IBM Systems Journal*, January 1972), I began hearing grumblings that the users had not received the system they wanted; later on, there were even suggestions that IBM had failed to deliver the system it promised.

I have not been in a position to substantiate these third-hand rumors,

However, in early 1975 I began hearing rumors that the code itself was rotten. A telephone conversation with the maintenance manager of the *Times* project provided me with the following information:

- Despite its use of structured programming, the code was difficult to understand and modify.
- There were serious efficiency problems, partly because several functions were duplicated and were executed redundantly in a sequence of off-line batch programs.
- Some modifications were difficult to make because modules were highly coupled together.

This is not to suggest the code was bad – although the *Times* programmers are obviously in a better position to judge than we outsiders. I certainly think the code is better than that which would have been produced using "classical" techniques: on the other hand, it does seem that the system probably did not make much formal use of the techniques of "structured design" described by Myers, Stevens and Constantine in the May 1974 *IBM Systems Journal*.

Edward Yourdon

New York, N.Y.

A clarification of "who said what to whom" appeared in the July 16 issue of *Computerworld*. Ed.

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We'll be taking an in-depth look at the changing world of data communications networks in the November 26th issue of *Computerworld*. And we'll give special emphasis to how they should be planned. Edited by Ron Frank, this supplement will be filled with input from users who understand this environment with all its implications, and you'll get the benefit of their experiences. You'll see stories that evaluate common uses of data communications, like batch versus on-line, private lines versus dial-up lines, all-digital versus analog lines, and the use of newly emerging carriers. And you'll see stories that point out ways you can get the least cost on your configurations.

If you're involved with data communications - or if you will be in the future - you should be reading this special supplement in the November 26th issue of *Computerworld*. And if you're marketing data communications products or services, you should advertise them here. But don't miss the November 7th ad closing date. Contact your area *Computerworld* salesman for complete details. Or call Judy Milford at (617) 965-5800.

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Reader Commentary

Programmer Mystique Can Enhance Professional Image

By Jerrold Asher
Special to Computerworld

Almost daily we hear a plaintive cry for more professional recognition of programmers. The most recent was recorded in a computer trade book article comparing programmers to physicians and lawyers as co-professionals.

Programmers seeking respect by associating their art with that of doctors and attorneys overlook one simple fact – human life and personal property are two of man's dearest possessions. We are quite willing to pay whatever price the seller of protection services charges.

We stand in awe of whatever mysterious alchemy that protector practices on behalf of our preservation. We maintain our admiration even when it often turns out the practiced skill is no more than a simple ability to compare our symptoms or situations with others found in reference texts. (Computers are used to perform this function in medicine and law. Are they professionals, too?)

I quite agree with my fellow programmers that our services are equally dear to businessmen. Unfortunately, the businessmen do not see it our way. They see a physician saving their personal being, the attorney saving their corporate being – but what kind of savior is a programmer?

Freedom of Spirit

Furthermore, programmers seek respect on the one hand while condoning freedom of spirit on the other. The two don't mix. Ever see a doctor or a lawyer greet clients in peace beads and sandals? Or arrive at a client's place of business on a Honda 440?

Programmers should be aware of the extensive regimentation and formality used in training physicians and attorneys – all of which is carried into their professional practices.

Doctors wear lab coats. Lawyers go before robed judges in conservative business suits and ties.

Doctors are never addressed by their given names and never their surname unaccompanied by "Doctor." Lawyers bury every major or minor proceeding in pounds of documentation – all too long (14 in.) to fit a standard business file – written in obscure terms only they can interpret. Again, this is a form of regimentation used to make us civilians aware of the presence of a true professional.

Programmer Mystique

What programmers must recognize is the use of symbols and trappings by the respected professionals. Programmers need to make use of their own panoply of mystique to enhance their professional image. Certainly the terminology is there. We can trap any businessman in the bits, baud and byte routine. Perhaps a little more formality or some form of uniformity in personal appearance would also help.

What is almost imperative is a stronger public relations effort to convince businessmen (who pay for our services) how invaluable, necessary and precious our "professional" services are. One suggestion is that articles, news releases and stories on computer applications be written with emphasis on how computers have become the survival kits for business in the ever-intensifying competitive struggle.

Let us show and tell how measurable dollar savings were made, personnel saved, information brought forth which was not otherwise available. Writers should stay away from showing the relative low cost and ease with which needed programs are generated. More dear-to-life pricelessness and product previousness for programming should be underscored.

Another item programmers overlook in their striving for professional recognition – professionals never never undercut each other's prices. Physicians do not compete on price.

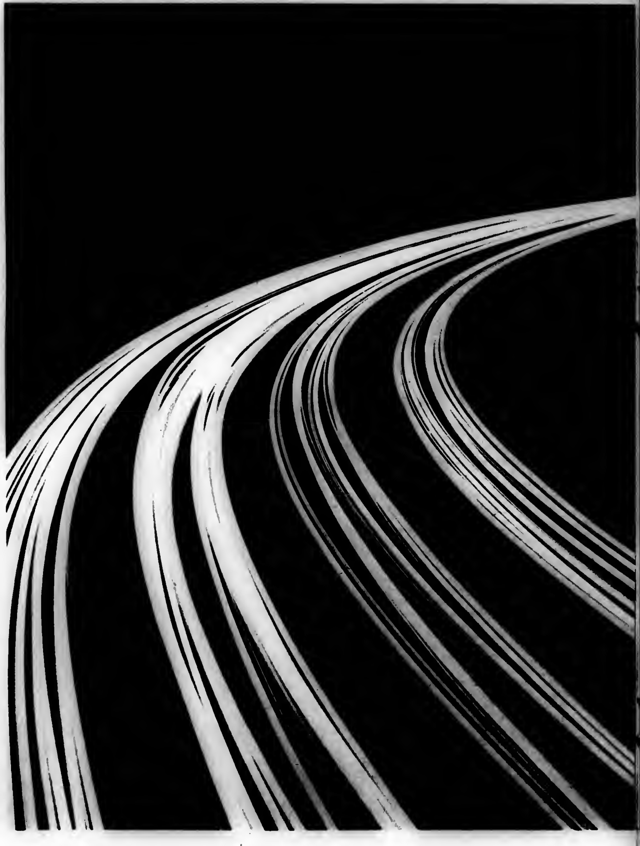
They belong to a very tight society called the American Medical Association which helps them set price schedules jointly. It then rules that such schedules are absolutely fair when we civilians have a complaint.

The attorneys do much the same. If you doubt this, try shopping around on the cost of a standard legal procedure such as drawing a will or probating an estate.

Programmers do not consult on price schedules. They bid either what they feel the traffic will bear (successful practioners) or whatever it takes to get the job (newcomers to the field). No wonder businessmen treat us like a pack of rabble, playing one against another.

Programmers must band together when it comes pricing time. As Benjamin Franklin so deftly put it: "We must all hang together else each hang separately." What we need is a joint

(Continued on Page 20)



Policies Written for Precomputer Age

Companies Often Not Insured for DP-Related Risks

By Roy N. Freed
Special to Computerworld

From a Legal Viewpoint

Have you ever read an insurance policy to see whether your company had adequate protection with respect to its involvement with computers? You ought to try it some time – when you're in a very expansive mood.

I've had a number of occasions to do it recently, for different types of companies, and find it to be a challenging experience – to say the least.

Those companies included a systems house supplying hardware procured in the OEM market and its own application programs; a supplier of software programs alone; and a commercial time-sharing system operator. Note that the last company has potential exposure as a user as well as a supplier.

How would you go about the project? I tried to start simply by reading the policies. The difficulties of that approach quickly showed me the better way.

My effort to apply the provisions to a client's operations – more specifically, to its activities fraught with risks of loss to itself and harm to its customers and to complete outsiders – convinced me I had better take time off first to catalog those risks.

Thus far, very few people seem to have been ready, willing or able to analyze activities of companies involved with computer technology and come up with a good list of the types of risk exposure they face – and those few do not seem to include insurance specialists. It's a difficult, time-consuming task that, unfortunately, appears also to be essentially a negative exercise.

Cushion for Catastrope

Actually, the analysis of types of risk exposure has very positive qualities because it provides the only sound basis on which to plan a proper insurance program that will provide a cushion against a number of potential financial catastrophes.

Many companies do not yet have those cushions and are unnecessarily vulnerable where insurance is available at reasonable cost. Risk exposure analysis also is the foundation for a risk exclusion program for limiting exposures by appropriate provisions in agreements.

To start things off, I decided I would try to make up a list of general types of risks. I recognized I probably could not complete the task myself, but I could make a good start and pave the way for its completion by personnel of my clients.

My contribution was to identify the potential broad areas of exposure to insurable risks, based on my general legal sensitivity.

These areas of exposure include, for example, bodily injury to people and damage to property that might be suffered by so-called third persons if a computer-controlled industrial process runs amok; harm to professional reputation or exposure to the fallout of a malpractice charge if an engineer is furnished with erroneous computations for use in his practice; and loss imposed on customers in ordinary businesses if data bases or software program data in the supplier's computer are destroyed or if programs, whether used remotely in that computer or onsite in the customer's computer, are erroneous, to name only a few horrors.

Note the variety of legal categories involved. They include negligence, products liability, harm to professional reputation, loss of property and breach of contract. They also might include libel or slander.

The list should really be more detailed and complete, but even this sketchiness provides enough material for policy analysis, namely the specific types of coverage for which to look.

The first thing that will strike you in studying insurance policies is the fact that the traditional policies all were written for a precomputer society. They talk in terms of tangible personal property and physical products. Products are insured only after they leave the possession of the supplier.

All in all, policies raise almost more questions than they answer. They reveal many risks are not insured.

Myopic Companies

Essentially, we are confronted with the need for policies that

(Continued on Page 20)

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Insurance Policies Expose Firms to DP-Related Risk

(Continued from Page 19)

are designed with computer technology expressly in mind. When will insurance companies rise to the occasion?

To indicate the myopia of some insurance companies, let me review an experience I had at a recent conference. An insurance specialist gave a seminar on insurance needs in the computer industry. He treated risks involving hardware, media, and service bureau operations and spoke of property, valuable papers, business interruption and errors and omissions coverages.

I asked about coverages for software suppliers whose programs might cause an industrial process or medical use to go awry. He couldn't picture those possibilities, being oriented only to business data processing.

After much nagging on my part, he went back to the office and tried to draft a new type of policy to cover those risks, but all he could picture still were business data processing mishaps.

Insurance underwriters, like many other professionals, must become more sophisticated respecting computer-communications technology.

How do we contribute to that sophistication and start to get insurance coverages needed by many types of computer industry suppliers? By starting to analyze risks of businesses and then reading insurance policies.

Policies must be read closely, much as one would read documentation of a software program. The coverage needed must be provided for clearly and positively. It must not be excluded either categorically or by a restricted definition.

A limitation to tangible personal property might exclude a customer's data base stored in a supplier's computer or software programs, which probably will be defined as information-processing processes – and hence intangible personal property – for many legal purposes. We need a cadre of people who can do a professional job in this important area.

Incidentally, we'll be playing this "tangible"-"intangible" game repeatedly in this column. The concept crops up in taxation, product liability, antitrust and many other legal areas.

Parting Shot

Just a parting shot to put something in your bag of tricks. It is possible to buy property insurance to cover replacement cost, rather than actual value after depreciation.

But the higher coverage is enjoyed only if the lost property is actually replaced. But replaced with what? The same thing? Or a more advanced item with greater capability or capacity?

This is an important question in light of the great dynamics of computer technology. As critical as it is, the word "replace" is not defined in the policies I have examined.

Get its meaning clarified by having the insurance company or broker write you a definition – and do so well in advance of suffering a loss.

In another column, I will treat the matter of indemnification commitments extracted, in supply contracts, from either the supplier or the customer. These are useful measures that are similar to insurance contracts in effect, so long as the Indemnitor has the financial resources to back up its commitment.

There are many performance evaluation tools...
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Mystique Can Help Enhance Image Of Programmers as Professionals

(Continued from Page 18)

committee on pricing. This committee could establish suggested prices for applications programs, operating systems, I/O drivers, utilities, new language programs, communications handlers. It could also establish suggested hourly rates for time and materials programmers based on experience – just as medical or legal specialists are 'allowed' to charge higher fees than general practitioners.

More professional emphasis is definitely in order for programmers. A little more regimentation, formality, better public relations and collusion in pricing, and the professional status will follow automatically – just as it has for physicians and attorneys.

Asher is director of marketing with Telos Computing, Inc. in Santa Monica, Calif.

Letters to the Editor

Literature Needed On Cobol Debugging

I would like to respond to Kenneth Morris' "Debugging Help Asked" [CW, Oct. 15]. I believe there is a noticeable absence of literature which addresses procedures for debugging from only core dumps.

A primary reason for this, I feel, is this approach to debugging requires knowledge of certain areas which may not be attributed to the Cobol programmer. This includes fluency with BAL to interpret at least the instruction which caused the exception and an understanding of the organization of the object module that has been formatted by the Cobol compiler so key areas of core (DTFs, IOAREAS, WORKING-STORAGE, TGT, PGT, etc.) may be located and identified in a timely fashion.

Additionally, it requires a healthy understanding of LIOCS which would assist in the interpretation of the contents of DTFs and IOAREAS, which, in turn, is important to identify where in the processing the exception occurred.

I would be interested in reader response to the question – would there exist a market for such a document – "Debugging From Core Only" – among Cobol programmers?

Roger Poole
Danbury, Conn.

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Problem-Solving Style Imposed

'Domain-Specific' Languages Would Help: Hammer

By Molly Upton
Of the CW Staff

MINNEAPOLIS – "Restriction and discipline are worth one heck of a lot," Michael Hammer, assistant professor at MIT, told the ACM '75 session on programming language theory recently.

Speaking on "The Design of Usable Programming Languages," Hammer advocated the use of "domain-specific" languages.

In particular, Hammer said that by appropriately limiting the programmer's freedom of choice, the number of decisions he must make are reduced and he can concentrate on the application area itself.

"Most people would rather be told where to start," he said. Languages should be designed for individual problem areas and each language should be built around a style of problem solving, an algorithmic structure appropriate to its application domain.

Such a language should include a style of problem solving and programming that forces the programmer to use a particular methodology and style of writing, he said.

"The fabric of the language will be woven around the problem domain," he explained.

"If the programming language embodies the structure, learning the language is equivalent to learning to write programs," he remarked. This had been true of several languages, such as RPG; GPSS, used in simulation; Planner, an artificial intelligence language; and BDL, a business DP language he has worked on.

For instance, there is some truth in the axiom, "Once you've seen one RPG program, you've seen them all," he added.

"Most languages are afflicted with the problem of too much generality," he said, citing the first of his irregular rules: "A language that is equally good for everything is equally bad for everything." In other words, if it doesn't force the programmer into certain structures, it doesn't help him.

The second of his rules is that Basic – "fill in your favorite language" – is not an easy language. For instance, although Basic makes it easy to write statements, this is not true about the overall construction of the program, he said.

Declarative Programming

Hammer advocated the declarative programming approach which incorporates an algorithmic organization into a programming language and provides descriptions of the result of a computation rather than explicit instructions to a processor.

"Our fundamental attitude is that a user understands the data with which he is concerned, and the manipulations which are to be performed on this data, and even how these manipulations are to be organized – provided this organization is expressed in terms of the data," he said.

Techniques Hammer advocated included the use of problem-oriented, implicit control structures; declarative, data-driven programs, and data flow specifications of where the data is going instead of how it gets there.

One problem is how to recover acceptable performance from this type of programming. He dismissed as a solution the idea that hardware will speed up, thus eliminating the problem.

Although these types of programs have been shown to be up to five times as slow as others, however, the cost of writing the program is increasingly overshadowing the cost of running the programs, he said, except in real-time situations.

There is a growing need for powerful optimizing compilers to handle these programs, he said, adding it is fortunate there are new opportunities for optimizing programs in more powerful ways.

"Since our programs will be written in data-oriented, high-level terms, it will be feasible for a compiler to 'understand' what the program is trying to do and generate a good implementation of the intent, based on various global criteria," he said.

More research and development efforts are needed to fully develop his approach, Hammer said, including determination of appropriate domains for specialized languages.

Not only does research need to be done in the technical area, but also in the psychological realm, he said.

The basic computational structures peculiar to each domain need to be isolated, but some insight on the psychology of computer programming is also necessary to determine what basic computational primitives people seem to possess, find easy to use and can readily learn, he remarked.

Free-Form Data Put Into Files Managed by 'Update' Dictionary

SYRACUSE, N.Y. – Virtually any file structure of a user's choice can be created and supported from "free-form" data input to IBM 360/370 installations equipped with the Update data maintenance package, according to its vendor, American Computing Systems Co. (ACSC).

In this environment, each input data field is preceded by a field number identifier and is terminated by a field separator identifier. Updating is controlled by file dictionaries.

All types of files are handled, ACSC said, including sequential, indexed sequential and data base organizations such as those used by Cincom System's Total or IBM's Dbomp or IMS.

Update's capabilities are application- and device-independent, the vendor said.

With the file dictionaries, records may be updated by furnishing only the key and new field contents. Beyond that, new records need not be furnished in their entirety; all fields not entered will be blanked or zeroed as appropriate, a spokesman noted.

Although fragmentary input would normally be difficult to monitor, the ACSC package is said to provide an audit trail – with any errors encountered and actions taken – showing the transaction key and type, field identifier and both old and new data content.

Because Update is modular, it lends itself to applications other than data maintenance, the vendor claimed, noting for example that the free-form multi-record input can be combined into a "single, easy-to-handle record structure for use by a specialty program."

Update has been used under DOS, DOS/VS and OS systems and is available now for $5,750 from ACSC at 624 Teall Ave., 13206.

'Auditor' Preps EEOC Reports

MONTVALE, N.J. – The Automated Compliance Auditor from Information Science, Inc. is designed to provide information an organization requires to comply with Equal Employment Opportunity Commission (EEOC) reporting rules.

Written in ANS Cobol and BAL, the package can be linked with the using organization's personnel system or used as a stand-alone application.

In addition to meeting EEOC reporting demands, the Auditor should help organizations identify problem areas before they become serious, the vendor noted.

Reporting in seven areas is supported by the Auditor. It generates parity reports, for example, which relate the internal distribution and utilization of an organization's work force to the external labor force. The work force analysis reports show distribution of employees by job, grade, race, sex and age.

Two outputs closely related to each other are applicant flow reports, which analyze applicants by race, sex, source of hire and point of hire, and employment reports, which analyze recruitment and placement patterns in relation to sex, race and age.

Activity into and out of jobs, grades and locations with reference to the relevant labor pools is analyzed in the transfer/promotion reports generated by the Auditor. Separation reports analyze the job, grade, reason, race and age of each move out of the organization.

Supporting data listings are said to itemize applicants, new hires, transfers, promotions and separations for management in a format more concise than those required by EEOC.

The software runs in 100K memory on an IBM 360/370 under OS. For $17,500, users can acquire source code, training manuals, an audio cassette, slides and a programmer instruction manual.

Information Science is at 95 Chestnut Ridge Road, 07645.

EXCPs in TSO Halved by 'QED'

RESEARCH TRIANGLE PARK, N.C. – Large-scale IBM 360/370 users operating with TSO may be able to cut EXCP time in half through the use of QED, an editor program from Triangle Universities Computation Center (Tucc).

QED is a data set editor which operates under TSO with OS/MVT or OS/VS2 Release 1.6. The syntax is said to be compatible with that of the VS2 Release 3 TSO EDIT command.

Although a functional replacement for the IBM-supplied TSO editor, QED differs from the TSO EDIT command under MVT in that its edit work data sets are retained in memory at all times. This is the feature that cuts EXCP times in half, a Tucc spokesman said.

Developed here at Tucc for the center's own workload, QED has provided the staff with "significant interactive computing growth capability" on a 370/165. Without QED, TSO expansion here would have required additional hardware, the spokesman added.

The editor package is available to educational institutions for $800, to all other users for $1,800, and may be ordered through P.O. Box 12076, here in Research Triangle Park, 27709.

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Performance Evaluation and Improvement

Saul Stimier, author of *Data Processing Systems: Their performance, evaluation, measurement, and improvement* will lead this two-day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Realtime, Batch and interactive time sharing systems.

Cost for the seminar, including continental breakfasts and luncheons and all course materials is $250.

San Francisco	**Dunfey's Royal Coach**	**Jan. 9-10**
New York	**Summit Hotel**	**Feb. 23-24**

How to Increase Programming Productivity

John W. Brackett, PhD, Vice President of SofTech, Inc., will lead this two-day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation; and Chief Programmer teams. Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is $300. Additional registrants from the same company are charged only $250.

New York	**Essex House**	**Jan. 26-27**

Data Base Design

Given in association with Leo J. Cohen and Performance Development Corporation, this three-day seminar is a package-independent examination of the techniques required for the design of effective data base systems. The seminar covers Effective Record Design, Physical Storage Techniques, Optimum File Organization/Indexing Techniques, File Integration, and much more.

Cost for the seminar, including course materials, continental breakfasts and luncheons is $350. Additional registrants from the same company qualify for a reduced rate of $300.

Denver	**Denver Hilton**	**Dec. 1-3**

Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N. Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this 2½-day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is $325. Additional registrants from the same company are charged only $275.

San Francisco	**Hyatt Regency San Francisco**	**Nov. 12-14**
Chicago	**Hyatt Regency O'Hare**	**Nov. 19-21**

Data Communications Course #1010 — Practical Data Communications Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two-day seminar on the newest advances in data communications. The course covers areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of Satellite Carriers.

Total Cost, including workbook, reference materials luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for the reduced rate of $300.

Miami	**Marriott Miami Beach**	**Nov. 17-18**

Data Communications Course #1020 — Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications networks. This three-day seminar covers procedures, approaches, and algorithms for evaluating and cost-optimizing network operations. Total cost, including an extensive set of customized course materials, is $450. Additional registrants from the same company qualify for a reduced rate of $400.

Miami	**Holiday Inn Airport Lakes**	**Dec. 1-3**

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'SSDM' Backs Structured Programming

SEATTLE, Wash. – A four-day training course and three application packages, all available separately from Boeing Computer Services, Inc. (BCS), are said to speed and simplify program design, coding and maintenance for users in IBM OS or OS/VS environments.

Called Systematic Software Development and Maintenance (SSDM), the BCS approach is based on top-down design and structured programming. It involves a set of procedures governing seven phases in a project's life: requirements definition, preliminary design, detailed design, coding, certification, installation and maintenance.

The Design Expression and Confirmation Aid (Deca) software accepts multilevel, top-down design representation as input. From that, it produces a "thorough, easily read" design document for use in design verification as well as reviews with the user, BCS said.

The Translator for Structured Fortran (Transfor) program is a preprocessor that extends Fortran for structured programming and is said to be compatible with all IBM Fortran compilers.

Though structured programs can be written in standard Fortran, BCS noted the results are often only slightly better than nonstructured code.

Enforced Nesting

Transfor is designed to allow users to write efficient, structured programs free of GOTOs. Use of statement numbers is eliminated and the nesting of control structures is enforced by the automatic identation of control statements, the vendor claimed.

The Software Utility Routine (SUR) is a program library maintenance system. It is said to provide a means of building and retaining programs in source, object and load module forms and for introducing and testing the effects of program changes. It appears, therefore, to be generally comparable to various library systems already on the market.

Deca is available for $6,000; Transfor, for $4,000; and SUR, for $5,000. The four-day course is $375/student at a BCS regional training center, but is also available at customer locations on an RPQ basis.

SSDM is being marketed by BCS through P.O. Box 24346, 98124.

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PL/I Meeting Calls for Papers

KEYSTONE, Colo. – "Data Base and High-Level Language Interfaces" will be the focus of the 1976 PL/I Winter Symposium and papers are now being solicited by Cibar, Inc., which is organizing the meeting.

Scheduled to run from March 1 through March 5 at the Keystone Lodge here, the symposium will start with an "intensive" data base tutorial.

Monday of that week will include an introduction to data base requirements in the morning and consideration of relational data structures in the afternoon. Tuesday's program will cover hierarchical and network data structures.

Wednesday's first session will be on language interfaces and will be followed by three consecutive sessions focusing on vendor interfaces. Thursday will start with an examination of data item dictionary interfaces and then move along into presentations of the three papers to be selected from the current call for papers.

On the final day of the conference, attendees will hear about implications of data bases in the areas of reliability, security and privacy. The symposium is expected to end at lunchtime to accommodate homeward-bound travelers.

Registration fee for the symposium is $150 and does not include hotel reservations.

Details on the papers being sought and on registration are available from Roger J. Jones at Cibar, Suite 120, 2850 W. Serendipity Circle, Colorado Springs, Colo. 80917.

Correction

Info-Dyne, Inc. the company which recently completed a study of major users of remote-computing network facilities [CW, Oct. 15], is now located at suite 196, 4600 W. 77th St., Minneapolis, Minn. 55435.

Runtime Controls Upgrade 'CBLshort'

LYONS, Ill. – The CBLshort precompiler for IBM DOS and DOS/VS users has been modified to make some of its features into user options selected at runtime, according to its vendor, General Electronics.

The effect of runtime selection is to make the system more tailored to user needs and to require less memory than with the generalized version.

All the features of the original package are available, including support for margin alignments, generation of JCL and punching a new source deck or running in load-and-go mode.

The abbreviation table, allowing users to use shorthand for many of the required or commonly used Cobol words, is also dynamically allocated at runtime in this latest version of CBLshort. Extending the table when more abbreviations are needed requires nothing more than allocating a larger partition for it to run in, General Electronics said.

Written in ANS Cobol, the precompiler – with its own source code – is available for $300 from the vendor through P.O. Box 79, 60534.

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Identify Goals or Expect CPE to Fail, Conferees Warn

By Don Leavitt
Of the CW Staff

NEW YORK – Computer performance evaluation (CPE) can provide significant leverage in improving the efficiency and effectiveness of computer- and human-related activities. But participants in a workshop on the subject agreed there are also significant opportunities to misuse CPE techniques.

Performance Evaluation

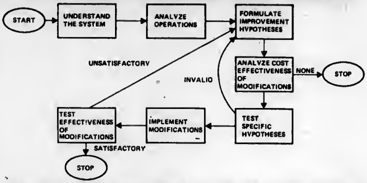
Sponsored by the Association for Computing Machinery (ACM) and the National Bureau of Standards (NBS) in 1973, the workshop conclusions were summarized for the first time by Barry W. Boehm and Thomas E. Bell in a recent issue of the ACM Sigmetrics quarterly, *Performance Evaluation Review* (PER).

Productivity increases averaging 15% to 30% are generally achievable on third-generation equipment. However, only increases resulting in improved value or decreased cost have utility to the organization involved, the authors noted.

Again, the current state of the art could support "far more productivity increases" than are realized, but "inadequate motivation and insufficient education" limit its application.

This situation is aggravated by the lack of a handbook to apply the current knowledge, Boehm and Bell continued, pointing out "one of the strongest recommendations" made at the workshop was to have such a manual written by NBS or the Computer and Business Equipment Manufacturers Association.

Improvements in application programs and direct user provisions offer the most potential for productivity gains in both the short and long term, the workshop concluded.



Applying the "scientific method" approach to a CPE project, attendees recognized a flow such as this would provide a structure and a feedback mechanism for refining results to the degree considered satisfactory.

Perhaps most important for the user just getting into CPE, the workshop recognized measurement does not constitute performance evaluation. Evaluation takes place with respect to the objectives and goals of an organization and "usually includes some measurement," Boehm and Bell added.

Following an orderly methodology is critical if measurement or modeling is to be successful, they found. Picking a measurement tool, collecting some data and only then attempting an analysis will seldom suffice as an evaluation procedure. Guidelines for organizing the process are available, the authors noted.

Specifically, they warned, current tools make possible the collection of a wide variety of performance data, but it is often not the most effective type and "frequently causes human and machine inefficiencies."

For example, they explained, computer accounting data can be used efficiently "but accounting systems are frequently so unwieldy analysts refrain from using the data," and improved accounting systems and associated analysis software are a "major national CPE need."

Similarly, hardware monitors are "somewhat difficult" to use because probe points are located "deep in computer circuitry" rather than being immediately accessible at a standard connector.

Improved hardware monitor interfaces constitute another major CPE need the workshop concluded, although discussion recognized difficulties imposed by changing computer technology.

Important Variables

There are numerous important variables arising from measurement or modeling that must be studied in evaluating performance. Representation schemes such as Kiviat graphs or simple models often aid analysts, the authors acknowledged.

One of the more serious problems, however, is that models of computer performance "frequently" are developed and applied without reference to empirical data, and data collection is "usually" performed without using any model to aid in experimental design.

Modeling and measurement should be combined in both application and research efforts, Boehm and Bell stressed.

In an apparently paradoxical thought, they also noted "the objective of a performance analysis should not be to achieve the highest possible component utilization: in fact, higher utilization often implies reduced computing effectiveness." The objective of any CPE effort should recognize both the costs of a computer installation and the needs of users for service in a stable environment.

There wasn't total agreement on all points at the workshop and, in fact, the authors' 36-page summary, in the July 1975 issue of PER, is entitled "Issues in Computer Performance Evaluation: Some Consensus, Some Divergence."

This particular issue is available in limited numbers – at $1.25/copy for ACM members, $1.75/copy for nonmembers – from ACM headquarters, 1133 Ave. of the Americas, 10036.

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Fedsim Study Finds

System Architecture May Alter Apparent Priorities

By Arthur Lovelace
Special to Computerworld

The Federal Computer Performance Evaluation and Simulation Center (Fedsim) has completed a study of two Xerox Sigma 5 systems performing the message-switching function on a nationwide network.

Performance Evaluation

Although the Xerox systems are not in wide use in the general DP community, the methodology behind the study and the overall findings should be of substantial interest to a much larger audience.

The study started with a pair of machines that seemed to be overloaded and compute-bound in many instances, even though their CPUs apparently had the highest possible priority. As Fedsim discovered, these conditions were more apparent than real.

As background, the network under study provides a single integrated record communications system which efficiently meets the day-to-day as well as emergency needs of the organizations involved. It utilizes both an automatic, direct-dialing circuit-switching system and a computer-based message-switching system.

It was thought the operating efficiency of the Sigma 5s, though satisfactory, could be increased. Concerned about the high CPU usage per character through the system, network management asked Fedsim to investigate.

Fedsim monitored the two systems to identify any actual or potential bottlenecks and then made recommendations for improving the performance of each system.

Monitoring Experiments

Fedsim gathered traffic volume and descriptive data from on-site data collection and reduction software. Two separate monitoring experiments were conducted at each computer using a Comten Dynaprobe-7900 hardware monitor.

From the first experiment's examination of hardware utilization levels, Fedsim determined the high CPU usage per character through the system was not being caused by overloading the system. Indeed, just the opposite was true.

During the monitoring time period, the system was active only 45% of the time while the CPU was active only 30%. Also, each of the peripherals was busy much less than capacity.

Still seeking the reason for the high CPU utilization, Fedsim designed a second experiment to examine memory bank busy times and instruction execution activity by the CPU. Analysis of the results of this experiment revealed the problems causing the suspected inefficiency.

Of the eight banks of 16K words monitored, Bank 0 was busy 40% of the tored time, while Banks ·1-7 had busy times totaling only 8%.

The operating system and the tables accessed by the Communications Input Output Processors (CIOPs) were located in Bank 0. The instruction execution activity analysis revealed 58% of the time was spent executing instructions located in Bank 0.

The remainder of the instruction execution activity was distributed throughout other areas of main memory; no significant peaks occurred. It thus appeared Bank 0 was a bottleneck.

Extraordinary Hold-Off

Another messurement, made to determine the extent to which this bottleneck affected performance, showed the amount of time the CPU was prevented from accessing Bank 0. This hold-off time was expected to be small, since the CPU had a higher memory access priority than the CIOPs.

The CIOPs are the only units that compete with the CPU to access Bank 0, but measurement showed an extraordinary amount of CPU hold-off – almost 30% of the CPU active time. Further examination of the priority scheme showed the CIOPs could override the CPU's "highest" priority.

This, in effect, gave the CPU third highest priority (after the two CIOPs). Because most of the activity was in Bank 0 and because the CIOPs had top priority, the CPUs "did nothing' 30% of the CPU active time. This hold-off time accounted for the system's high CPU utilization per character.

Fedsim recommended the contents of Bank 0 be more evenly distributed throughout main memory to remedy this problem. Fedsim also cautioned the Xerox Sigma 5 users not to be confused by the terminology "highest priority" in relation to the CPU.

If CIOPs access the same bank of memory, the CIOPs may still override the CPU. This condition can result in high CPU hold-off times to memory and in decreased throughput.

In order to prevent needlessly high memory contention and consequently high CPU hold-off times, the CIOP tables and highly used software should not be placed in the same bank of memory.

Lovelace is with the analysis directorate of Fedsim, based in Washington, D.C.

System Charging Workshop Subject

PALM SPRINGS, Calif. – The Sigmetrics technical meeting on pricing computer services, to be held at the Riviera Hotel here late next week, will explore theoretical and practical ideas about policies for charging for services.

Scheduled for Nov. 20 and 21, the meeting, sponsored by both the national Sigmetrics and its Los Angeles chapter, will include both formal and informal sessions designed to encourage an exchange of ideas among the participants, according to general chairwoman Toni Shetler of Rand Corp.

Registration requests are being handled by JoAnn Lockett, also at Rand, 1700 Main St., Santa Monica, Calif. 90406.

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Offering May Bring Protests

AT&T Introduces Two Synchronous Dataspeed Terminals

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – AT&T has moved further into the realm of data processing with the introduction of additions to its line of Dataspeed 40 terminals – in spite of protests from others in the industry that the Dataspeed offerings may violate Federal Communications Commission (FCC) regulations.

The private-line offering is aimed at applications that require clustering capability and – as expected [CW, May 22, 1974] – synchronous transmission.

The latest Dataspeed 40 models feature synchronous line transmission protocol – the first at speeds of 2,400- and the second at 4,800 bit/sec) and permit clustering of display units and printers up to a maximum of 24 displays and 12 printer terminals, the firm said.

The units' interactive mode of operation makes them attractive for a variety of computer input/output applications, such as inquiry/response, data entry and retrieval, AT&T claimed.

Additional features include computer-controlled display formatting and data entry, whole character impact printing, built-in internal diagnostics and modular construction, it said.

The binary synchronous line protocol used is a standard that conforms to Ansi standard X3.28 and regulates message traffic by polling and selecting in a manner similar to that used in selective calling systems, AT&T explained.

The Dataspeed system uses a Station Cluster Controller which can handle up to six Device Cluster Controllers. These in turn can handle up to four displays and two printers each.

A full system would consist of one Station Cluster Controller and six Device Cluster Controllers, each with four displays and two printers for the total of 24 displays and six printers, the firm said.

The Device Cluster Controllers can be located up to 2,000 feet from the Station Cluster Controller and the displays can be located up to 100 feet from each Device Cluster Controller, the firm said.

Industry Objections

When the first of the Dataspeed 40 terminals were introduced in May of 1973 for asynchronous operation on switched networks at 1,050 bit/sec and 1,200 bit/sec, many figures in the industry complained AT&T was entering the data processing equipment business, which it is prohibited from doing by the FCC.

However, the firm claimed the offering was just an advance in the Teletype Corp. line of teletypewriters and "in no way constitutes a data processing service."

Several in the industry, however, charged the units were clearly designed for data processing purposes and not for the transmission of messages, as were the earlier teletypewriters.

Because of this, the sources charged AT&T had violated the FCC ruling that prohibits the firm from offering data processing products.

A Station Cluster Controller with the capability of handling four Device Cluster Controllers costs $170/mo (plus $6/mo for a mandatory pedestal). There is a $20/mo additional charge for handling six device Cluster Controllers.

The Device Cluster Controller capable

(Continued on Page 28)

NBS NAM Eases Access to Network Resources

By Robert Rosenthal
Special to Computerworld

WASHINGTON, D.C. – The National Bureau of Standards (NBS) has developed a Network Access Machine (NAM) – a specially programmed minicomputer – that automatically accesses resources available on computer networks for terminal users.

This NBS development aims to improve the efficiency and effectiveness of the Federal government's use of computer networks.

The NAM makes it possible to use one command language for accessing different resources within one network and even across multiple networks. The same, simple user commands or protocols for log-in, host selection and service selection are used to obtain all network services.

By automatically generating the necessary interactions that accomplish the user's intended function, the NAM allows the user to be more concerned with what service is required and less concerned with how to obtain it.

The NAM diminishes the maze of protocols that exist between a user at his terminal and network-based computer service. The user must typically know different protocols to communicate with the network and its host computers – to express his service demands to the computer and to understand the results or errors from the computer.

As manifested in the interactive dialogue between the user and computer, these user protocols are characteristically incompatible, ill-defined and machine-dependent.

The network user would be helped through this confusion of incompatible protocols by the ability to use one protocol to access all network services. Since standardization at the higher levels of user-network interaction could discourage competition among network service providers, it seems desirable to instead aim at compensating for nonuniformity in interface requirements through network access assistance to the user.

This idea of improving the low-level user protocol is not new to the computer industry. Catalogued procedures allow expansions of job control functions so the inexperienced user can easily perform complicated job steps and so the experienced user need not become burdened with the tedious task of explicit enumeration of detail in job steps.

This type of assistance can be extended beyond a single computer and placed in the interactive computer network environment. In such an environment, the user should be able to have specific programs, data and systems readily available from different computers without regard for such protocols as host computer selection, host computer log-in, host computer service selection, service initialization, service exit request, host exit request or network exit request.

Procedures on Macros

The NBS NAM alleviates this user problem with network protocols. Complex access procedures, coded and stored as macros on files in the minicomputer, are given simple names by the user. The macros are recalled from the file system by name and expanded by the NAM, producing the appropriate network or host computer dialogue.

At the time of the expansion, parameters can be passed to the macro: A possible use for a parameter is to identify to the macro a particular software subsystem. In this way, macros can be written like subroutines – general in scope, but made specific by the parameters passed to them.

The use of simple names for complex access procedures and the ability to pass parameters to macros makes the NAM a flexible aid for any user of computers, especially when the user accesses a variety of different computers.

The prototype NAM is used as a test bed at NBS to determine the utility of the NAM concept and to evaluate the effectiveness of a minicomputer in this application. A longer range goal is to use the NAM in extended applications where tutorial assistance to the user and automatic remote resource selection in a network can be provided.

The utility of the NAM is being demonstrated at NBS, showing the effectiveness of a minicomputer in this application. An NBS technical note describing the design and use of the NAM will be available in early 1976.

Rosenthal, project manager of the NAM at the NBS' Institute for Computer Sciences and Technology, can be reached for inquiries at the NBS Computer Networking Section, Room B-212, Technology Building, here in Washington, 20234.

Irwin Forecasts Regulated IBM As DP, Communications Overlap

By Ronald A. Frank
Of the CW Staff

CAMBRIDGE, Mass. – The increasing interdependence of computers and communications may well result in IBM becoming a regulated utility.

This prediction was made by Dr. Manley R. Irwin, regulatory expert and Federal Communications Commission (FCC) staff member, in an article on the future of telecommunications written for The Yankee Group.

In addition to IBM and the DP community offering more and more communications-type services, Irwin said the regulated telephone companies may soon be offering tariffed DP services.

"The carriers are establishing beachheads before the state regulatory agencies. The result may be that in two or three years such services will be upgraded into some software or manipulative capability rendered to the public. It is possible that regulated carriers will be offering a specie of computation on a tariff basis," Irwin said.

The Bell System recently introduced a display terminal with printing capability called the Model 40 teletypewriter. The Model 40 is presently a dumb terminal, but subsequent generations will incorporate data processing capability and this unit will evolve into an intelligent terminal, Irwin said.

Also mentioned in the article was Bell's Transaction Telephone, described as a "credit card verification unit which might be viewed as a specie of computation."

Future generations of Bell's Dataphone Digital Service might well incorporate software applications that will enable the

(Continued on Page 28)

Quality at low cost, the AJ 841

A lot of terminal users don't require the high speed and sophisticated versatility offered by many of today's computer terminals. And they don't need the higher prices either.

If your requirements are for a hard working, heavy duty terminal, and you don't need more than a 15 cps throughput, we have the answer. It's the AJ 841. You'll find it an ideal replacement for the IBM2741. Our new lower price makes it even more attractive. Fill in the coupon and let us send you all the details.

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N.Y. Attorney General Urges Interconnect Liberalization

By Edith Holmes
Of the CW Staff

ALBANY, N.Y. – Despite opposition from the New York Telephone Co., the attorney general of this state has come out in favor of providing a wider variety of interconnections for customer-provided equipment (CPE).

In a statement commending New York State's Public Service Commission for holding hearings on interconnect offerings, Attorney General Louis J. Lefkowitz urged the body to broaden its recommendations beyond requiring the phone companies to supply a simplified, low-cost interface device.

The commission should also provide an alternative to an inexpensive interface device in the form of certification by an independent certification laboratory, he said.

Such certification, he noted, is favored by everyone involved except the New York Telephone Co.

"We believe that the commission should provide an opportunity to the public to use equipment of their choice provided that it meets minimum standards to protect the integrity of the telephone networks," the attorney general said.

By making certification available from approved laboratories as well as the telephone companies, "the consumer will have a realistic alternative" without a decrease in "the high level of service required of the operating telephone companies," he added.

A certification laboratory would serve as a check on any company certification program, Lefkowitz noted.

"Without such independent certification, there would be little if any incentive for the telephone companies to reduce costs of interconnections," he stated.

Noting uncontested testimony before the commission showed between 90% and 95% of the answering devices attached to the New York Telephone Co. network are hooked up in an unauthorized manner, the attorney general said this noncompliance "is clearly related to cost.

"Such noncompliance is not in the telephone company's best interest or that of the public's," he continued. "However, its elimination can come about only with a reasonable and fair approach to interconnection such as would result from a certification program."

Synchronous Dataspeeds Added

(Continued from Page 27)

of handling two displays costs $140/mo (plus the mandatory $6/mo for a pedestal). There is a $32/mo charge for the ability to handle two additional displays, AT&T said.

Each display unit costs $63/mo and the printers cost $90/mo each, the firm added. The pedestal is optional for these units at $6/mo.

For a full system with one Station Cluster Controller, six Device Cluster Controllers, 24 displays and 12 printers, the recommended price is about $3,900/mo, the firm said, adding the representative price would work out to around $165/mo per display for the average installation.

For users who want a smaller configuration, the firm is offering a "mini cluster controller" which combines the functions of the Station Cluster Controller and the Device Cluster Controller. This unit is capable of driving two displays and one printer, the firm said.

The mini station controller costs $170/mo and is capable of handling one display and one printer. There is a $20 additional charge for the ability to add another display.

Shipments of the units will begin this month and will be available from Bell System operating companies by mid-1976, AT&T said. Several of the operating companies are expected to file tariffs on the offering this year, the firm added.

Regulated IBM Seen As Future Possibility

(Continued from Page 27)

phone company to perform "mixed elements of communications and computation," Irwin said.

IBM has announced plans to develop a domestic satellite system oriented toward the transmission of data and computer messages between terminal devices and computer centers. The system will bypass the local and toll facilities of the telephone carriers.

The FCC has approved the plan subject to IBM's willingness to interconnect the terminals manufactured by other firms to IBM equipment, Irwin noted.

Regulation vs. Competition

As the overlap between computers and communications becomes greater, it becomes comparable to the telecommunications industry which is regulated and the computer industry which is not regulated, Irwin pointed out. In this contest, AT&T has consistently advocated regulation instead of competition.

"If IBM continues to account for more and more of a percentage of computer mainframes on the grounds of corporate efficiency, IBM is inviting nothing less than the status of a [regulated] public utility," Irwin said.

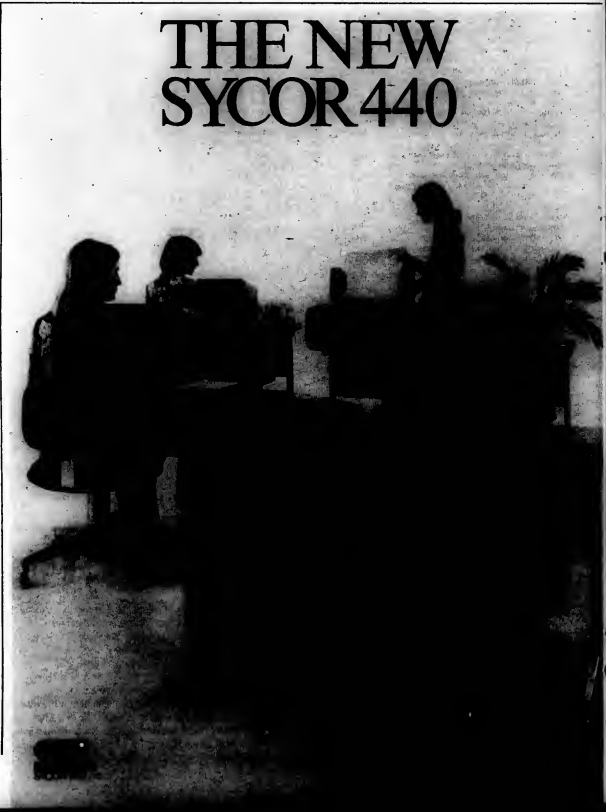
"Certainly, in the past, public policies have been reluctant to assign the bulk of an industry's output to one firm and to entrust that firm [with setting] the industry's prices, profits, and investment decisions," he added.

"It is perhaps ironic that the regulated nature of the mainframe industry rests on the government's antitrust suit. An IBM victory may well spell an industry defeat; an IBM loss may well spell an industry victory," Irwin said.

The article was written as part of a continuing research study by The Yankee Group called "The Unbundling of AT&T: Implications and Opportunities." The study is available from the firm at Box 43, 02138.

Correction

The price of the TP 2000 teleprocessing monitor from MRI Systems Corp. [CW, Oct. 15] is $25,000 for a paid-up lease.



Using Touch-Tone Telephones

Shoppers Order Catalogue Items Directly From System

TORONTO – Round-the-clock catalog shopping is on the way at Simpsons Sears Ltd. here thanks to a computer, an audio response unit and a Touch-Tone phone.

As a result of an experiment in which Simpsons telephone shoppers in the metropolitan area proved they liked communicating with the computer just as well as with the Simpsons operator, the nationwide department store expanded its Comp-U-Shop telephone-ordering service to 16 hours a day, six days a week and will go to 24 hours a day before long.

Ninety four percent of the system's users said they preferred this method to the traditional operator-assisted approach to catalog ordering," Mike Lutze told the Canadian Computer Conference here last week.

Lutze is manager of distribution and operating systems for the store.

The major hurdle that blocks nationwide implementation of the system is the fact that the largest proportion of telephone users here are still dial-phone users either by choice or because Touch-Tone service has not yet reached their area, he said.

Copes With Two Problems

Despite the curiosity the new system has generated, Simpson's Compu-U-Shop system was not installed as a novelty, but rather to cope with two problems that plague the catalog-shopping business, he said: transcription error and customer disappointment when the item ordered is out of stock, he explained.

One of six phone orders contains a transcription error serious enough to require special attention, he said.

"The customer, when making his selection, copies catalog number, color and size on a piece of paper before calling – potential error number one," Lutze said.

When the customer calls to place his order, he transcribes his written order into the spoken word. The Simpsons operator, in turn, transcribes it back to the written word – for potential errors two and three," he said.

CW in Canada

"The written orders are keyed in optical character recognition font by an order entry typist, for potential error number four.

Customer disappointment, the second source of difficulty, arises out of the implication that, if an item is displayed, it must be available, Lutze said.

The retail store merchant can avoid this problem by removing merchandise from the store.

The catalog merchant cannot do this since his pages are finalized months in advance of publication, he said.

Two Objectives

Before committing itself to any new system, Simpsons decided it must accomplish two objectives.

First, capture only valid order information by eliminating the multiple transcriptions in the conventional order-entry procedure, and, second, minimize the effect of customer disappointment by notifying the customer, when the order is placed, if the item is not available.

The classic data processing approach would have been an on-line order-entry system, Lutze said. However, with 600 catalog sales offices, the cost of terminals would have been too high.

The solution had to involve inexpensive terminals, and the Touch-Tone telephone seemed ideal. It was inexpensive, easy to operate, reliable and maintained by one of the largest service organizations in the country, he said. It has a numeric keyboard and earpiece for audio response.

More important, it was already installed in thousands of households at no expense to Simpsons.

Customers were surveyed to test their reaction to the system, and 2,000 in the metropolitan area agreed to participate in the test.

Simpsons built a special customer data base, accessible by phone number, with the customer's name, address, account number and delivery route number.

As Comp-U-Shop was conceived, the customer, using his Touch-Tone phone, dials into the switched network with Simpsons' Comp-U-Shop telephone number. The dataset answers the call and establishes a communication path to the Periphonics T-Comm 7 audio response unit.

This device is capable of accepting data keyed on a Touch-Tone telephone and passing it on to an IBM 370/158, Lutze said.

The 3705 communications interface connects the audio response unit to an IBM 370/158 containing the software and application program controlling the overall system.

When the customer's call is answered, the audio response unit is directed to say, "Sears Comp-U-Shop. Your home telephone number, please."

The number entered by the customer is used to access the on-line customer file and a record is retrieved. If the number entered is not a valid number (such as not consisting of seven digits or starting with the digits "0" or "1") or if there is no record found under that telephone number the program reissues the message.

After three attempts to retrieve a customer file, the call is terminated by the program and a message is issued for callback.

After the customer has identified himself, the system requests the first catalogue number of his order, Lutze said.

If the item is in stock, both quantity entered and current unit price are quoted so the customer may verify what he has entered.

If the item is flagged as being temporarily out of stock, the customer is advised and given the option of canceling the item or waiting for a delayed shipment. If the item is no longer available, the customer is so advised and the item order automatically canceled.

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The Sycor 440 System: the newest addition to our family of compatible intelligent terminals.

Our new distributed processing system lets you perform data entry and inquiry/response concurrent with background processing. So you don't need multiple systems to do multiple jobs. At $677 a month (for four keyboards, communications, cassette, and a five mb disk on a three year lease, with maintenance) you can perform all these functions—plus many more you never thought possible at such a low price.

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TAL II. To extend the 440's power, use our new data entry language, TAL II. This easy-to-use, high-level language lets you customize data entry programs. Instructions are also provided for arithmetic operations, conditional data entry, range checking, table look-up, equal/compare and a host of other intelligent features.

Shared file access.

The 440 system lets you share and access files locally, reducing investments in telephone communications and central CPU resources.

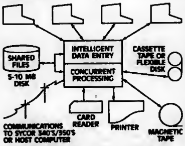
Data entry made easy. Now each operator, at her own display, can make use of current data in shared files to support data entry functions. For reduced keystrokes and lower error rates.

Inquiry/Response. File look-up is made simple with up-to-date information on-site, using the 440's own file management and disk storage capabilities.

System modularity.

Design your own system with a variety of options and peripherals.

Supports from 1 to 8 displays. Each is controlled by the Sycor processor and is capable of performing tasks independent of other displays.



Choice of 5 and 10mb disks. Store and retrieve programs, shared files, and data at remote locations.

Wide variety of peripherals. And to complete our system configuration, choose from matrix and line printers, computer-compatible tape drives, card readers, and a variety of communications options.

Compatibility.

There's full software compatibility with our Model 340 and 350 stand-alone terminals. Keyboards are also compatible.

Programming. One program fits three different systems—340, 350 and 440.

Communications. Communicate with the mainframe, emulating IBM 2770, 2780 or 3780 protocols. Or use the 440 as a polling station at your central computer site to receive and transmit data to remote 340s, 350s, and 440s.

Concurrent processing.

And best of all, while data entry is being performed in the foreground, you can be doing other jobs concurrently in the background. Jobs that can save you time and money. Jobs like:

Remote job entry. Use the 440 with its card reader and 300 LPM printer for large-scale remote job entry. And since the system contains a CRT and a keyboard, you don't pay extra for them.

Multi-terminal printer support. Each display can interleave print data to one printer as the data is being entered. So, you don't need a separate printer for each display.

Report generation. Sycor-provided programs let you produce all sorts of management reports—sales analysis, inventory, or billing—at the same time as you are performing data entry.

File maintenance. And the Sycor 440 allows you to do editing, sorting, updating, and file transfer in a background operation.

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The Hewlett-Packard 3000 is a minicomputer?

"The 3000 a minicomputer? I think calling the 3000 a mini is an abomination!"

When we asked Mr. Thomas Harbron, Director of the Computing Center, Anderson College, Anderson, Indiana, what he thought about the HP 3000, he had some very interesting things to say:

"We're using the 3000 for administrative processing, academic work and some commercial work. We have 27 terminals and we selected the 3000 because we wanted a system that would provide us with remote access and would do general purpose types of things from the terminals. The 3000 allows us to do many different things at different terminals. In fact, it does everything we expected it to do and was the only machine we could find in its price class that would. I'd recommend the 3000 to others. It's a powerful and versatile machine. And it's cost effective as well. It's half the price of anything that comes close to it."

"I don't think that Hewlett-Packard ought to call the 3000 a minicomputer. It is a complete medium-sized system."

That's what the EDP center manager of an aircraft manufacturer said about the 3000. He also had this to say:

"One primary reason we bought the 3000 was to collect and analyze radar development data. The problem is that we have to collect data fast enough, pipe it to a computer, analyze it, and then make the necessary instrument adjustments. HP's 3000CX was the answer. We also bought it for its interactive capability. Very significantly, in our acoustics department we had to have the ability to turn around data analysis fast. The 3000 has been a real cost saving computer for us. For the last two years I was the entire staff for the 3000. Not a great deal of detailed knowledge of the system is necessary. Technicians can use it without much training. I'm very much sold on the 3000. And it's definitely a complete system—not a minicomputer."

"It allowed us to run eight times the volume at a third the cost. No minicomputer could do that!"

The above statement was made by the corporate banking division EDP manager of a major California bank. He also said:

"We've had the 3000 for over nine months. A year ago we were on a time-sharing system and the cost became prohibitive. We contacted six different companies to look over and bid on a proposal that defined our needs. HP was the only one that could handle our total application of management information for the Corporate Banking Division. The 3000 is not just a mini—it's much more. We're constantly amazing people here with what we can do. It's not hard to operate, not hard to cope with. But our favorite topic is that we're paying less than one third of what we were paying and running four times the volume. And this year, we'll double our volume again. That's eight times greater and less than one third the cost.

That's really productivity!"

“We found the only thing mini about the 3000 was its price.”

When we asked the EDP center manager of another major manufacturing company about the 3000, that was what he had to say. He also had this to say:

“Our computer needs include both scientific and commercial applications. We were phasing out our teleprocessing terminal and our Environmental Monitoring Division's computer. So we started looking. We spent several months studying computer systems, and rated them on speed, versatility and ease of operation. The result of our study showed that the HP 3000 provided these requirements and had the best cost/performance ratio. We didn't fully realize the potential of the 3000 until we started programming it. We have experienced a significant cost savings in the seven months we've had the 3000 and we expect a greater savings in the months ahead. We really like the interactive CRT for programming and data input. Being a multi-programming system we can have many users on at the same time. The power and speed of the 3000 is equal to a large machine. It's no mini. Calling it the Mini DataCenter is more accurate. I'd definitely recommend the 3000 to other potential users. In fact, we already have. We feel they would be money ahead.”

We're glad these and other users of the HP 3000CX set us straight. We called it a minicomputer because its state-of-the-art technology lets us sell it for a minicomputer price. From now on we'll call it a Mini DataCenter.

We want you to get the whole story. Write us for your copy of our HP 3000CX Mini DataCenter booklet. We know you'll find it interesting, informative, and maybe a bit surprising.

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Burroughs TU 1700 Terminals Designed for Banking Industry

DETROIT – Burroughs has broadened its line of terminals for the banking industry with the introduction of the TU 1700 series of teller terminals.

The series includes a 60 char./sec matrix printer, a choice of visual display configurations, capabilities for use of magnetically encoded plastic cards and a hand-held keyboard with which customers can enter their personal identification numbers.

The TU 1700 series includes four models. Any combination of models with numeric or alphanumeric keyboards may be selected and combined in a branch location or in a network. All models provide alphanumeric output.

The models are code-compatible with current TU 700 series teller terminal models. This protects the user's investment in currently installed equipment and application programs and also means a user can replace teller terminals with TU 1700s or can mix TU 1700s in an existing network without modification to the branch processor or central computer's programs, Burroughs said.

Among the features of the TU 1700 series terminals are:

- A matrix printer which provides 60 char./sec alphanumeric printing on a 150-position print line, with a programmatically controlled tab and return function for positioning to the most significant character at 150 char./sec.
- An input and display subsystem with either a Self Scan display that is an integral part of the TU 1700 console or a CRT display located near the console.
- Either of two magnetic card reading modules. The modules are compatible with current industry specifications for second-track or third-track read.
- A transaction control keyboard which is under program control and provides numeric entry, eight transaction keys, 16 character keys and 16 operator control keys. In addition, an alphanumeric keyboard is available.
- Automatic passbook reading (APR), which is in use on many of the currently installed TC and TU series teller terminals. APR provides automatic reading of the passbook balance, account number and next posting line, using information stored in a magnetic stripe attached to the passbook.
- An optional, hand-held keyboard which allows the cardholder to enter a personal identification number to verify that he is an authorized user of that card.

The four models include the TU 1702 numeric keyboard basic teller terminal; TU 1706 alphanumeric keyboard basic teller terminal; TU 1752 numeric keyboard teller terminal with APR; and TU 1756 alphanumeric keyboard teller terminal with APR.

TU 1700 lease prices range from $233 to $330 per month; with purchase prices ranging from $7,000 to $9,800.

Micom Multiplexer Handles Synchronous, Asynchronous Lines

CHATSWORTH, Calif. – Micom Systems, Inc. has announced the DDM 40/01 time division multiplexer, with prices starting at $1,000, to multiplex synchronous and asynchronous terminals or modem links into a synchronous serial data stream compatible with voice-grade, broadband or Digital Data Services.

Interfaces are available for direct connection to either the Bell DSU or CSU. The Micom DDM 40/01 uses a timing concept that permits use with multiple dial-up synchronous channels.

Asynchronous lines, either dedicated or dial-up, can be intermixed with the synchronous lines.

A small number of asynchronous terminals, for example, can be intermixed with a higher speed device such as an RJE terminal for transmission over a single leased line, the firm said.

Synchronous lines of practically any speed can be intermixed for transmission over a link with excellent efficiency at speeds of 600 bit/sec to over 230,000 bit/sec, the firm added.

Both synchronous and asynchronous channel interface modules are available for dial and polled network operation.

The DDM 40/01 is available in table-top and rack-mount configurations supporting from two to over 4,000 channels. A working system with units at both ends of the link costs about $2,800, the firm said from 20426 Corisco St., 91311.

How To Train Your Programmers in Assembler Language for $15 Per Student

During the last three years, we have developed and published two books on System/360-370 assembler language—one for DOS, one for OS. These books are so effective that most DP professionals can learn assembler language from them using the books alone. In fact, as you will see later, I guarantee it.

Once a programmer finishes our assembler language text, he is more productive. Why? Because he can quickly find the statement that caused a program check . . . regardless of the language he's using. Because he can write and use assembler language subprograms. Because he can maintain and develop complete assembler language programs . . . even ones that use ISAM or direct files. Because, for the first time, he understands what is happening as his programs execute . . . he's independent, he's in control.

4 Reasons Why These Books Are Effective

1) These books were written by an expert from industry, Kevin McQuillen. He's been a DP manager, consultant, and manufacturer's rep so his books are chock full of solid, practical, real world advice.

2) Kevin selected the content of these books based on an analysis of the tasks normally required of an applications programmer. That's why these books contain everything of use to the average programmer and very little that isn't. That's also why the books give substantial coverage to job control language. The DOS book covers DOS and DOS/VS; the OS book covers MFT, MVT, VS1, and VS2.

3) The books are organized in the most effective way possible for a programming course. Quite simply, a complete subset of BAL is presented in the first three chapters of the book. After this, all material is organized by function (debugging, table handling, subroutine linkage, etc.). As a result, the student always sees the relationships of the parts.

4) Each book contains dozens of complete program listings. They start with card-to-printer programs and end with programs that create and retrieve direct files. In between there are listings for routines and programs that perform code translations and input validations, set up the linkage between mainline modules and subprograms, load and use tables in storage, create and retrieve sequential and ISAM files, and so on. In our experience, these listings, more than any other factor, determine whether or not a course is effective. And they are the missing ingredient in most assembler language courses.

How You Can Use These Books

When you order these books, you will have several options as to how you use them. If you don't really have a training program, you can simply pass the books on to your programmers. If they have the aptitude for BAL programming (as they probably do), this by itself should accomplish your training objective.

If you want more control than that, you can set up a progress schedule for each student and assign a senior programmer to be available for questions. To test mastery, you can assign problems from the book or actual production jobs. When a student writes and tests the required programs, you will be convinced of the effectiveness of our books.

If you have an existing training program in assembler language, the quickest way to increase its effectiveness is to give our book to all students. Because our books contain dozens of complete program listings, they quickly improve coding techniques. Because they provide detailed procedures for testing and debugging, they quickly improve debugging efficiency.

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Because there are so many ineffective books in our field, I don't expect you to take my word for any of this. All I ask is that you try our books. If you do, I'm absolutely convinced that your programmers will learn from them.

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User Benefits Depend on Storage Requirements

By David N. Freeman
Special to Computerworld

Users might wonder whether there are any positive reasons to move to on-line mass storage systems such as IBM's 3850, Control Data Corp.'s 38500 and Ampex Corp.'s Terabit memory.

Does this type of storage offer new functions, improved system responsiveness or improved mainframe utilization?

Unfortunately, the answer seems to be "no"; any function of response that mass storage devices offer can be more conveniently achieved with conventional disk subsystems. Even so, mass storage can offer advantages that are important to some users.

Who Needs Mass Storage

Most installations requiring at least 20 billion bytes of on-line storage, but none requiring less than 5 billion bytes need mass storage.

Using the newest IBM disk generation, each 3350 spindle holds approximately 317 million bytes on-line. Twenty spindles can satisfy a 5-billion-byte requirement cost-effectively, although resulting response times are much faster than needed for most applications.

Mass Storage
Part 2

Storage requirements for data bases dominate all other on-line needs: systems residence, program libraries, scratch storage for sorting and file processing plus queue space for jobs and message processing.

However, 70 to 80 spindles of 3350 storage are required to keep 20 billion bytes on-line; this represents a staggering monthly rental plus difficult problems of creating and managing adequate floor space and operations coverage.

The above parameters – mass storage devices for installations exceeding 20 billion bytes, conventional disk storage for installations less than 5 billion bytes, with a gray area between – depend of course on current offerings of the disk manufacturers. Should a major manufacturer unexpectedly offer a billion-byte spindle, one might scale up "20" and "5" to "50" and "15," respectively.

Considering the rapid increase in spindle capacities cited earlier, how can we justify "20 billion" and "5 billion" today as coefficients for long-term choices pro or con mass storage systems. The answer is simply that applications requring massive on-line storage typically experience steep annual growth in space needs; today's 20-billion-byte data base may well grow to 50 billion bytes by 1980.

In one industry after another, one application area after another – customer information, production and inventory control, sales forecasting, scientific and engineering calculations, etc. – on-line data bases have grown as rapidly as the capacities of succeeding generations of disk devices.

(Continued on Page 36)

Itel Plans 3350, 3850 Equivalents For Virtual, Non-Virtual Shops

By Patrick Ward
Of the CW Staff

SAN FRANCISCO – Itel Corp. will introduce equivalents for IBM's 3350 disk drive and 3850 mass storage system but – unlike IBM – Itel will support the products on 360/65s under OS and VS and on non-Virtual 370s as well as on Virtual machines.

Itel's 3350 equivalent will offer about the same 317M-byte storage as IBM's 3350, but will have a removable disk, according to Richard A. Whitcomb, a vice-president of Itel's Data Products Group.

Called the 7330-12, the disk drive will be able to share the same controller as Itel's current 7330-I and 7330-II drives, both of which will be field-upgradable to 7330-12s.

Univac's Information Storage System Division (ISS) will build the drives with shipments beginning in early 1977, Whitcomb said.

ISS will also build the Itel 7850 mass storage system which will appear in the third quarter of 1978, he said.

Itel also plans to add a 6,250 bit/in. tape drive from Telex in mid-1976 and add-on memory for the 370/168 in January, Whitcomb added.

On the software side, Itel is working on Vtam for 360 OS and DOS/VS shops; support for its 3330-equivalent disk drives under OS/360; video console support for OS/360 and DOS/VS; Data Language/I for 360 OS and DOS/VS shops using Vsam; and a teleprocessing monitor, according to B.R. Cabanis, vice-president of systems support.

The announcements fit in with Itel's view that the "migration game is over" and that both the 360 and 370 have long product lives ahead of them, Whitcomb said.

He pointed to the high number of purchased machines in the field, including some 70% of the 168s. "You're not going to find that the people who bought those machines are going to turn around and buy something new," he said.

Current 168 users have plenty of capacity and a wide peripheral choice; they can afford to sit tight, he said.

Whitcomb doesn't see an IBM Future System announcement coming until 1980-1981, and then it will be a "traffic cop" distributed processing system that will work with 370s, he said.

In the meantime, IBM is enhancing its 370 line, he said. The company may announce a "148" with improved price/performance early next year and may also field-enhance 168s at about the same time, he said.

IBM has already improved the internal performance of its European 370/115s and 125s by 15% to 20%, he said.

Like the 360s and 370s, IBM's 3330 drives have a lot of life left in them, Whitcomb said. "What's been purchased won't go away," he said, predicting a slow migration from the 3330s.

IBM's 3850 is "a good technology," but initial deliveries will be slow, Whitcomb said. "IBM has some problems with it, no question."

Two Key-Display Systems Among Offerings From MDS

PARSIPPANY, N.J. – Mohawk Data Sciences Corp. (MDS) has announced additions to its key-to-disk product line which, it said, offer users an orderly upgrade to current systems at price/performance ratios virtually unmatched in the industry.

The Model 2409-2 key-display system, with disk storage capacity of 90,000 125-character records, was introduced for large installations keying high volumes in multiple shifts.

The Model 2409-3 key-display system, with disk storage capacity of 150,000 125-character records provides greater capacity than the 2409-2 and permits easy expansion for the user as volume and use grows, the firm said.

Software announced at the same time allows the user to custom-design validation and edit routines during the data preparation cycle for the 2409-2 and 2409-3 systems as well as the previously introduced 1204, 2409-0 and 2409-1, the firm said.

The firm will also offer concurrent processing on all MDS key-to-disk systems, including the Model 1200.

The 2409 systems offer tripartitioning, allowing foreground, background and independent activities such as communications, media conversion and printing to occur simultaneously with keying for optimum multifunction economy, MDS said.

Up to 64 subformats per job are now available on all MDS key-to-disk systems as well, allowing the operator to focus attention on keying rather than decision making.

An additional feature allows the operator to display prompting messages on the keystation screen.

Cumulative Storage

The 2409-2 and 2409-3 key-display systems fit bidgets and requirements ranging from keypunch replacement to large, clustered data entry, the company said.

The large disk provided with the 2409-2 and 2409-3, in addition to handling routine large-volume data entry tasks, allows cumulative storage of data which is collected only weekly or monthly.

This eliminates the need to separate infrequently run jobs into smaller batches, the company pointed out. The extra capacity is also useful for holding a

(Continued on Page 34)

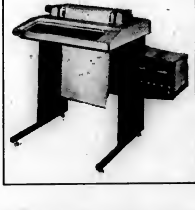
Upkeep Fees Rise 9% For Univac Products

BLUE BELL, Pa. – A 9% increase in maintenance charges for all Univac computer products and systems, effective this month, has been announced by the firm here.

A 5% increase in rental charges for certain terminal devices also took effect Nov. 1.

The terminal products affected include the Uniscope 100, Uniscope 200, DCT 475, DCT 500, DCT 524, DCT 1000, DCT 2000, DCM and modems.

No increase in the purchase or rental prices of computer systems and other peripherals is planned at this time, the firm said.



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Eliminates Data Entry Backlog

User Sidesteps Card Costs by Switching to Key-to-Disk

By Richard DeFord
Special to Computerworld

SPRINGFIELD, Mo. – By switching the bulk of its data entry workload to key-to-disk, the General Council of the Assemblies of God overcame a big backlog and sidestepped rising card prices.

Beyond that, the data entry work now takes one-third fewer man-hours than it did.

The data entry workload at the General Council is widely varied, including orders, subscriptions for periodicals, insurance programs, contributions, accounting applications, payrolls and miscellaneous jobs, as well as maintenance of inventories and the master data files involved.

The General Council has an inventory of 8,000 different items, publishes 21 different periodicals, offers an insurance program serving more than 11,000 persons and processes four payrolls. The council also processes contributions received for about 3,500 fund accounts, including the denomination's appointed missionaries.

Order and contribution documents number 2,000 daily, with an average of 12 transaction/document.

Operating two shifts, data entry previously consumed 500,000 cards and 3,900 man-hours per month. During a quarterly rush of Sunday School orders, the council had a backlog of seven days' work.

With this unacceptable backlog and soaring card costs, the council decided to investigate the claims of several data entry vendors.

The group settled on Univac's Cade 1900 system. It had a good price and it offered a Cobol subset compiler which allowed all four arithmetic functions plus table lookup, editing, range and validity checking, but without the software limits of other programs.

The council's largest application required 22 program cards under the previous system; Cade provides the selection of a desired "card" format in a fraction of a second.

It was easy to teach personnel to operate the system; no programmer is required. The Cade memory capacity can be expanded in-house without changing the system.

Maintenance support was one and one-half hours away, presenting the only undesirable aspect of the system. It is only 10 minutes away at the present time. There have been about 29 hours of downtime since the system's installation in October 1974.

In a year's time, the council's card usage has dropped to 50,000 per month; 2,600 man-hours do the work; and the backlog problem has been eliminated.

–DeFord is supervisor of computer services for the General Council of the Assemblies of God.

MDS Adds Key-Display Systems

(Continued from Page 33)

disk-resident library of user programs.

Price of the 2409-2, in a typical 16-keystation configuration, averages about $129/mo per keystation with maintenance included on a three-year lease.

The Model 2409-3, in a similar 16-keystation configuration, costs about $135/mo per keystation with maintenance on a three-year lease.

SIP Language

The firm is also offering more than 40 software packages for appropriately configured key-to-disk systems to enable flexible job definition and validation, formatting and arithmetic capabilities.

For the user who wants to do advanced editing or formatting on the key-display systems rather than on a mainframe, MDS has developed a programming language called Self-Interpreting Program (SIP) to complement the packaged software.

The SIP language allows users to design their own, unique data validation and manipulation functions at the data entry level, without having to resort to costly and time-consuming modification to mainframe software, MDS said.

Up to 16 SIP programs may be active at one time within the key-display operating system to assist the operator with keying and to edit data according to installation requirements. Multiple keystations can access the same SIP program simultaneously.

Concurrent Processing

The MDS 2409 key-display systems accommodate multiple functions in up to three partitions without interfering with normal keying operations.

The systems permit foreground keying and background key-to-disk functions, such as dumping to tape, as well as independent utilities such as various communication emulators, formatted printing or a variety of media conversion routines to occur simultaneously.

For the first time, background communications in IBM 2780/3780 mode is available for MDS 1200 system configurations.

Other communications emulators are available for nonconcurrent data communications.

Wright Line Adds Punches

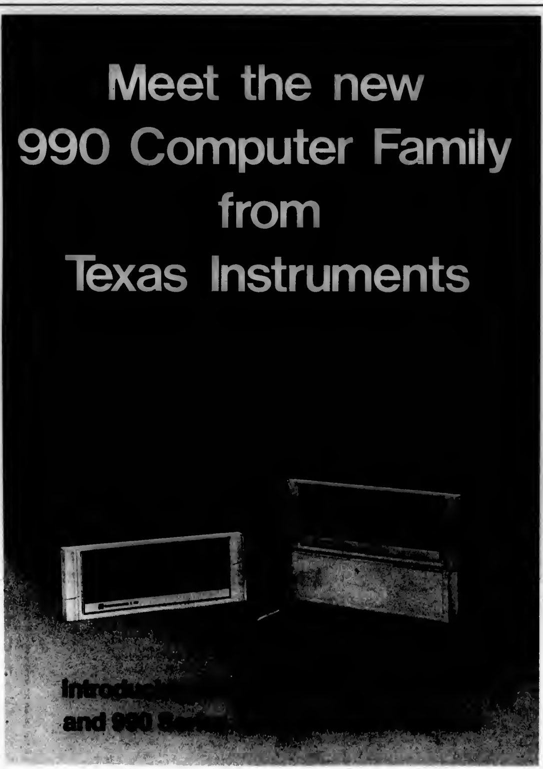
WORCESTER, Mass. – Wright Line has added two devices to punch rectangular holes in plastic badges or identification cards read by contact or photoelectric static card readers.

The models 2611-00 and 2621-00 punches are heavy-duty, electrified versions of Wright Line models 2610 and 2620.

The Model 2611-00 encodes standard 20-column Type 2 and 51 credit cards.

The Model 2621-00 encodes 22-column Type 3, 4 and 5 identification/badge cards; 15-column Type 1 cards; and 80-column paper or plastic cards.

Each device costs $1,195 from the firm at 160 Gold Star Blvd., 01606.



Hierarchy of Systems Helps Maker Test Carburetors

Special to Computerworld

ROCHESTER, N.Y. – A carburetor test system at General Motors Corp.'s (GM) Rochester Products Division (RPD) here harnesses the power of a hierarchy of computers to significantly extend large-scale, high-speed test operations.

For example, individual test stands perform a variety of functions and test different models concurrently. Programs at individual test stands can be changed at the touch of a button. Software development is handled in the same central system concurrent with on-line testing, and the system can be expanded with relative ease to handle additional function and test volume as dictated by operations.

Designed, implemented and operated by testing and engineering personnel in RPD's Manufacuring Development Department, the on-line real-time system presently has 30 test stands in operation, but could handle hundreds.

"We have evolved from manually operated drill presses to dials and transfer lines for machining of parts and now to the computer for calibrating and testing of carburetors," said Bernard E. Frank, manager of manufacturing development.

The hierarchy of computers includes specially designed controllers or minicomputers that are part of each test stand. These serve as satellites to the remainder of the hierarchy that includes an IBM 370/145, System/7s and associated equipment and programming systems.

No Newcomer

RPD is no newcomer to computer-based test operations. In 1968, a process control computer was put to work controlling over 100 test stands.

Still in operation, it has the capability of calibrating and testing upwards of 23,000 carburetors daily. The test stands are wired directly to the computer, which is backed up by a second computer.

In 1971, RPD heard that, for 1975-model cars, it would have to test a much more complex carburetor. That meant a new test facility would have to be set up. While the existing system was performing to specifications, it was already operating at capacity.

"The logical first reaction was to consider duplicating the old system, but that would not have meant progress," said Lawrence B. Barnes, staff production engineer in computer systems engineering. Barnes supervised development of the new system and now has overall responsibility for its operation.

"We had been thinking for some time of the advantages to be gained if we could readily change test stand functions. Redesigning and rewiring of a test stand is a costly and time-consuming effort that can be justified only in certain situations.

"We wanted the flexibility to make test stand changes through programming or software changes. From this capability, a number of advantages would follow."

RPD first decided to put a minicomputer in each test stand. Specially designed to meet the company's requirements, the mini would provide computer control at each stand, housing the software for whatever job was on the stand.

An alternative was to buy test stands with advanced electronic controls; but the cost when compared with the mini was almost a trade-off, and the mini provides far greater flexibility.

At that point, the hierarchy in RPD's planning consisted of the minis linked through communications cables to a central computer.

"As we studied this idea, however, we saw it inhibited the very flexibility we were after," said Barnes. "As the number of test stands in the system is increased, the added load is placed directly on the central computer, which reaches its capacity that much sooner.

"Moreover, the polling function in such systems is critical; it requires that the system check each test stand once a second, placing a significant workload on the central computer. It also makes a second backup computer mandatory so that operations can continue if the first system should go down."

System/7s Used

This led to the concept of using small-scale IBM System/7s "between" the satellite minis and the central computer. The System/7s are each capable of monitoring up to 31 test stands.

They do the polling, causing software and other information to be transmitted from the central computer to the individual test stand, as needed, and transmit test and other measurements generated at the test stands to the central system.

The smaller computers also serve as backup.

This means that, even if the central computer should discontinue operating, test operations can continue for about eight hours with full capability. If both the System/370 and System/7s are down, the minis continue operating the stand on the model carburetor it is set up for.

In preparation for use of a general-purpose computer, manufacturing personnel are inevitably thrust into the world of DP software – operating systems, sophisticated control programming, software interfaces, etc.

The alternative is to assemble an in-house staff capable of designing and implementing the complex software or to have it constructed by outside specialists as a one-time job.

RPD opted for something of a middle road. Seven programmers were hired as an in-house staff to concentrate on the applications and functional computer programs.

System programming was contracted to IBM Services on a fee basis. Essentially, the software consists of the OS/VS1 operating system, the Customer Information Control System (CICS) for communications, and software specifically involving the Model 145 and the System/7s.

RPD programmers are doing a limited amount of this work to gain expertise.

"A major advantage of the new system showed up during the installation stage," said Paul H. Grabowski, supervisor of the central system. "We were able to handle applications programming and the related software development concurrently with on-line test work.

"The programmers use the system by means of 3277 visual display terminals. On the earlier system, programming changes have to be made when the system is not in use, such as on holidays and Sundays. Now software development is done during daytime hours and done concurrently with test operations.

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The TMS 9900 Microprocessor

The TMS 9900 is a 16-bit, single-chip microprocessor using MOS N-channel silicon-gate technology. Its unique architecture permits data manipulation not easily achievable in earlier devices. With its repertoire of versatile instructions and high-speed interrupt capability, the TMS 9900 microprocessor provides computing power expected from a 16-bit TTL computer.

The Model 990/4 Microcomputer

It's a complete computer on a single printed circuit board using the TMS 9900 as its central processor. The 990/4 is ideally suited for terminal control, peripheral device interface control, and as a CPU for OEM customers.

In addition to the TMS 9900 microprocessor, the 990/4 microcomputer contains up to 8K bytes of dynamic RAM, up to 2K bytes of static RAM and/or PROM, eight vectored interrupts, front panel interface, real-time clock input, two I/O buses for low- and high-speed devices, and optional ROM utilities.

With the 990/4, you can select a low-cost OEM package, a 7-inch or 12¼-inch rack-mountable chassis, or a table-top enclosure . . . and memory expansion to 58K bytes.

Price: The Model 990/4 microcomputer with 512 bytes of memory is only $368* without chassis and power supply. This same model with 8K bytes of memory is only $512*.

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The most powerful member of the family is the Model 990/10 general-purpose minicomputer. The 990/10, a TTL implementation of the 990 architecture, provides the high-performance speeds demanded in many applications.

A memory mapping feature providing memory protection and privileged instructions supports memory expansion to two million bytes. And TILINE**, an asynchronous high-speed I/O bus, supports both high-speed and low-speed devices. Chassis options are the same as those for the 990/4.

Price: With 16K bytes of memory, chassis, power supply and programmer's panel, the Model 990/10 minicomputer is only $1968*.

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Mass Storage Benefits Depend on User Requirements

(Continued from Page 33)

Typical early IBM System 360 installations needed only three to five 2311 disk drives (total of 25M bytes) for systems residence and scratch storage, since most of their data bases were retained off-line on magnetic tape.

Four years later (1970), these installations had moved important applications – batch and on-line – to disk and were utilizing two to four 2314 facilities (total of 500M bytes) for all random-access functions, with tape playing a continually diminishing role.

By this year, many large installations had migrated even further to on-line storage, utilizing five to 10 3330 disk facilities (total of 10 billion bytes).

Although appetites for on-line storage must ultimately level off, it seems probable that 2,000 to 3,000 installations worldwide will each require one or more trillion-bit devices by 1980.

So far, we have avoided the "gray area" of storage requirements cited above: 5 billion to 20 billion on-line bytes. It is premature to offer a recommendation for installations in this category, since their choices will depend on the degrees of success achieved by IBM and especially CDC, whose mass storage system device is sized for this market.

The IBM, Ampex and Precision Instruments devices are sized for installations requiring at least 20 billion bytes, although a minimal Ampex system furnishes 11 billion bytes.

Should IBM or CDC succeed in delivering a reliable mass storage system with good responsiveness, software support and so forth, one would not hesitate to project for them a large share of this intermediate-sized market.

IBM has been selling 3850s primarily as replacements for magnetic tape, typically for libraries of a few thousand master-file reels. To date, few IBM installations have planned to replace many disk subsystems with 3850s, even though IBM's announcement and promotional literature emphasizes the reliability and cost-effectiveness of 3850s for on-line disk-oriented applications.

In fact, the principal reason for IBM's announcing their Virtual Direct Access Storage concept earlier this year is to support the 3850 in a convenient, disk-like manner.

Principal Contenders

CDC and NCR founded a card/tape peripherals manufacturing firm, Computer Peripherals, Inc. (CPI), approximately three years ago. CPI has the mass storage system development and manufacturing responsibility for its parent companies – recently expanded by International Computers Limited's buying into CPI – and it will also meet mass storage needs of other firms in peripheral-equipment partnerships with CDC such as Honeywell.

Ampex has developed its Terabit memory over the past eight years, and several units have been delivered to federal agencies. Ampex has continually adapted its basic Terabit memory videotape transport to current-line operating systems from IBM, Digital Equipment Corp., etc.

At present, Ampex is developing software necessary to operate its memory with IBM's OS/VS operating systems.

Ampex now has off-the-shelf hardware/software memory capability for major mainframes from IBM, DEC, etc.

Delays in delivering mass storage systems have been due as much to customer slowness in setting up suitable operating environments as to hardware/software problems of the manufacturers.

Factors precipitating serious consideration of a major change in file storage are typically imminent exhaustion of computer-room space or imposition of an enormous new application on an installation.

The principal gains from mass storage are projected to be as follows, in approximate order of importance: reduction of file storage space – floor space for drives, shelf space for reels and packs; automated management of mass storage cartridges/reels, rather than haphazard, error-prone manual handling of tape reels; and, ultimately, reduction of file storage costs, subsequent to a major conversion of on-line disk storage to mass storage at an installation.

It seems unlikely a mass storage system will reduce operating costs so long as it only replaces part of the magnetic-tape library and drives. Furthermore, half-inch magnetic tape is such an entrenched standard it is difficult to foresee IBM's mass storage cartridge displacing tape within the next two decades.

Finally, one must remember how slowly the large VS operating systems are being accepted by IBM customers. Counterparts from other computer manufacturers are faring little better.

Whatever the causes, slow acceptance of OS/VS implies even slower acceptance of IBM's mass storage devices, since the latter are software-supported only by the former.

Freeman is a senior associate at Ketron, Inc. in Wayne, Pa.

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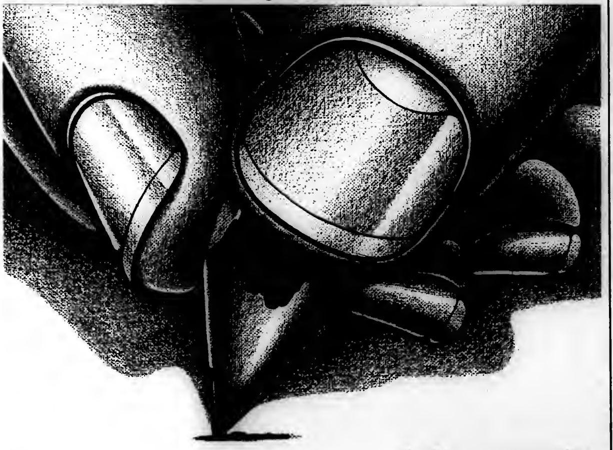

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Mini Bits

Diva Unwrnps Lower Prices For Intelligent Controller

EATONTOWN, N.J. – Diva, Inc. has unwrapped new lower pricing for its intelligent controller, Computroller III, and related products.

The pricing for the Mass V systems (DD-50, DD-52 and DD-54) with 27.3M to 82.1M bytes per spindle are, $13,600, $16,000 and $17,400, respectively.

Add-on disk drives for the Mass V series systems range from $6,500 to $9,500. The standard Computroller III has 8K bytes of memory buffering.

These systems are presently compatible with Digital Equipment Corp.'s PDP-11, Data General Corp.'s Nova and Eclipse and Interdata's CPU product lines.

PDP-11-Compatible Prom Expanded

TROY, Mich. – System Associates has announced expanded programmable read-only memory (Prom) capabilities.

To the existing 1K-word Proms compatible with the Digital Equipment Corp. PDP-11, customers can now order Proms from 1K words to 8K words in increments of 1K.

The 8K Prom is priced at $2,000, while the 1K Prom costs $600.

The Prom uses one slot.

The firm is located at 55 Park St.

8080 Designers Get Manual

WALLINGFORD, Conn. – Northeast Services, Inc. has announced a Mycro-Tek 8080 design manual written for the hardware designer. The design manual emphasizes hardware definition and design and covers 8080 signal definition, timing and state transition, memory configurations, control panel design, use of an 8080 Proto-typing Board (available for $750 in quantities of one) and a standard 210 control panel.

It is priced at $24.95 from the firm at 34 Highland Ave., 06492.

Brochure Describes Applications

PALO ALTO, Calif. – "HP Math" is a brochure that describes the applications of the HP Math software packages. It is available without cost from the Hewlett-Packard Co. at 1501 Page Mill Road 94304.

Mini Applications Seminar Topic

WASHINGTON, D.C. – "Minicomputers: The Applications Explosion" is the title of a three-day seminar to be presented by the American Institute of Industrial Engineers (AIIE) here Nov. 17-19.

Information is available from AIIE Seminars, P.O. Box 25116, Los Angeles, Calif. 90025.

Monitors Device in Calves

System Aids Artifical Heart Study

PALO ALTO, Calif. – At the Stanford University School of Medicine, a recently installed minicomputer is helping to evaluate the functions of an implantable artificial heart that ultimately is intended to assist the failing human organ.

In the project, sponsored by the National Institute of Health, the artificial heart-assist device and its power source are implanted in calves and monitored by the computer to get the needed physiological data on its performance.

"The minicomputer is a critical part of the necessary instrumentation designed to observe what is going on during and after implantation," according to Dr. Allan K. Ream, assistant professor at the medical school's department of anesthesia.

"Although the measured parameters change from experiment to experiment, we typically monitor pressures in the arteries, veins and the chambers of the animal's heart."

More data is gathered by measuring arterial flow to the lungs and near the bypass device as well as the heart rate received from the electrocardiogram. This resulting information is then used as the basis for calculations of about 30 variables.

"The immediate use of the minicomputer system is to monitor the performance of the new heart device. However, there is a long-term interest in its development as the prototype of an operating-room monitoring system for human heart surgery that is more efficient than those currently available," Ream said.

The Hewlett-Packard (HP) system used in the tests consists of a 21MX minicomputer with 16K bytes of semiconductor memory; a 5M-byte disk; a 16-channel, single-ended input analog-to-digital converter; and a CRT terminal which serves as the system's console. Printed copy is obtained from a line printer shared with another university department.

"The computer is also used to analyze the voluminous data for us," Ream said.

The present $24,000 system is being expanded to include plotting capabilities and a larger 32K-byte memory.

Decision Data System/3 Printers Available for Use on Model 8

HORSHAM, Pa. – Decision Data Computer Corp.'s 6603 and 6606 line printers, recently introduced for System/3 Model 10, are now available for use with System/3 Model 8 computers, according to the firm.

The 300 line/min and 600 line/min printers are available as direct replacements for the IBM 5203 printer used on System/3 Model 8 computers.

With monthly rentals as low as $410, the 6603 can provide substantial savings for Model 8 users requiring 300 line/min printing, according to the firm.

In addition, the 6606 printer currently represents the only way a Model 8 user can obtain 600 line/min printing, as IBM offers only the 5203 printer on that system, and its top speed is 300 line/min, the firm said.

Monthly rental prices for the 6603 and 6606 System/3 printers, including maintenance, range from $410 to $825 depending upon contract term and model selected. Purchase prices range from $18,150 to $25,220.

Wangco Introduces Disk Drive Series

LOS ANGELES – Wangco, Inc. has announced a series of cartridge-type magnetic disk drives.

Designated the "Super" series, the drives feature front-loading (2315-type) and top-loading (5440-type) models, using the removable disk cartridge and an internal fixed disk.

Capacities are available from 2.5M bytes to 25M bytes, recording 100 track/in. and 200 track/in., with recording densities as high as 4,400 bit/in. in the top-loading models, Wangco said.

The Super series uses a recently developed brushless DC motor, which is an integral part of the disk spindle. No belts or pulleys are used in the drive system, the firm said.

Wangco is at 5404 Jandy Place.

At Iceland University

Freshmen Have 'Friend' in Mini

REYKJAVIK, Iceland – Here at the University of Iceland, the Department of Computer Services recently reported its IBM 1620 – installed in 1964 – is still going strong . . . but the emphasis on its use has shifted from that of a general-purpose machine to that of the freshman's "friend."

The 1620 was the first general-purpose machine to be introduced in Iceland. Because of increasing use, the original configuration of the university's machine was expanded to include 40K bytes, two 1311 disk drives, a 1622 card reader/punch and a 1443 printer.

While the research load at this 4,000-student university has shifted away from the 1620, with bigger mainframes becoming available for that purpose, the 1620 has increasingly become the "friend" of first-year students, who appreciate its simplicity of operation and are not seriously affected by its limitations.

During the winter semester of 1975, close to 9,000 student jobs were processed that way, along with some 2,500 other jobs, mainly small research jobs.

According to Dr. J. Thorhallsson, head of the Department of Computer Services, plans are being fomulated to retire the 1620 in the not-too-distant future.

But the philosophy of allowing the students to "operate" the real thing will prevail and play an important role in the selection of new hardware, he said.

DEC Graphics System, Configuration Debut

MARLBOROUGH, Mass. – An interactive graphics display subsystem, which is the base of a graphics hardware configuration, has been announced by Digital Equipment Corp.

Called the VS60, the subsystem is designed as an add-on for any PDP-11 computer.

The VS60, a high-speed analog stroke system, has a 21-inch (53 cm) CRT, light pen and a graphic processor, the display processing unit.

The first configuration incorporating the VS60 is designed as an intelligent graphics terminal. Called the GT62, the configuration includes the VS60, a PDP-11/10 minicomputer, a free-standing Ascii keyboard and provisions for communication links.

The VS60 display subsystem is priced at $38,800; the GT62, at $47,500.

The VS60 will be supported under both the RT-11 and RSX-11 operating systems with a Fortran graphics subroutine package.

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Company Uses Minis to Test Space Shuttle Fuel Tanks

NEW ORLEANS – Martin Marietta's Aerospace Division here is employing two minicomputers to perform structural tests and to simulate flight conditions to test the electronic subsystems of a space shuttle's external fuel tanks.

The giant, expendable external tanks to be built by the company will contain the liquid oxygen and hydrogen fuel for the three main engines of the space shuttle.

The space shuttle, which is scheduled for flights throughout the 1980s, will consist of two other main elements – the airplane-like space vehicle itself, called the orbiter, and the recoverable twin solid-rocket boosters.

Using two Varian Data Machines V73 minicomputers, the structural tests of a prototype of the external tank have already been completed. Currently, the company is engaged in developing the programming necessary to simulate the operation of the orbiter.

By simulating its functions, the computers will be used to check out the electronic operation of the external tank and assure compatibility of data communications when full-scale preflight tests are ready to begin.

With the space shuttle, the U.S. will enter a new phase of earth and space exploration and space transportation. It will be designed to transport a variety of space vehicles such as a space lab and communications satellites into orbit at a reduced cost. A two-week turnaround time is the goal for reuse of the space shuttle orbiter.

On a standard mission, the orbiter will "blast off" like a rocketship; remain in orbit like a satellite for seven days, delivering its payload; return to the earth's atmosphere, land like an airplane; and be readied for another flight.

Two launch sites are planned – Vandenberg Air Force Base in California and the National Aeronautics and Space Administration (Nasa) John F. Kennedy Space Center in Florida. The first flights are planned for 1979.

Simple Production Essential

Of special consideration is the fact that the external tank must be designed for simple production. The shuttle is expected to make 445 flights between 1979 and 1990, with a maximum of 60 flights per year. The expendable external tanks must, therefore, be mass produced in comparison with the production rate of any space hardware to date.

Resembling the fuselage of a DC-9 aircraft, the tanks will be 158 feet long, 28 feet in diameter and carry 1.5 million pounds of fuel and oxidizer.

It is to be totally constructed of aluminum alloy skin and support or stability frames. The sidewalls and end bulkheads will be thick, plate stock; the skins are to be butt-fusion-welded together to provide reliable sealed joints. The skirt aluminum structure will use skin/stringers with stabilizing structures.

The first task for the mini system has been in testing the scale models of the external tanks supplied by Nasa to Martin Matietta. The external tank model, 36 inches in diameter by five feet long, constructed of aluminum for strength and light weight, was tested structurally using approximately 120 strain gauges.

The gauges were placed, 60 inside the tank and 60 on the outer skin, to focus attention on those areas expected to experience the heaviest stresses, such as curved, seamed and thinner walled areas.

The tank was pressure-loaded with gaseous nitrogen in 20% of rated load steps and held. The mini "read" the gauges, logged the data and produced printouts of the stress in real time. A signal conditioning subsystem, with capacity for 64 channels and containing A-D conversion and signal amplifying circuitry, was used.

Simulation Studies

The simulation studies to be performed with the external tank entail using one computer to "look like" the orbiter itself in terms of communications. That is, the computer is being programmed to send and receive signals to and from the tank subsystems. This will enable Martin Marietta to validate the design of the external tank.

Sensors located in the external tank convert the physical data into electrical signals. These sensors include pressure, temperature and acoustic transducers, as well as accelerometers, calorimeters and radiometers (heat-measuring devices).

Frequency modulation and pulse code modulation telemetry techniques are then used to condition and multiplex the signals which are sent to the computers on board the orbiter or, in this case, to the computer, which takes exactly the same actions and makes the same decisions the actual flight computers will make.

The simulation checkout test will take about 16 hours to perform, since there are a host of steps and events that must take place even before the actual mating of the tank to the rest of the shuttle. The complete simulation program is expected to be completed by early 1977.

During the first test flights of the external tank, about 380 different measurements will be taken by computers on the orbiter. During ground test simulation, that many will also be taken. Once the shuttle flights are well under way and operational, only about 40 measurements will be necessary.

Each of the two Varian V73s contains internal memory space for 24K words plus a shared memory of 8K which operates between both processors.

The first computer performs in a data acquisition mode, storing collected data onto magnetic tapes. A disk subsystem with a capacity of 5M words contains the reference data – that is, the expected results.

The magnetic tapes are then placed on the other computer for data reduction, analysis and printout of results. This two-step process economizes memory space, H.R. Stunkard, project engineer at Martin Marietta said. To perform it in one step would entail use of about 100K of memory, he said.

The shared 8K memory contains both the Varian executive operating program and also is used to collect some portions of the test data.

The dual processing system also includes two disk drives with 2.35 million words each, three magnetic tape units, a line printer, card reader, two CRTs and a cassette drive terminal. A Varian high/low level analog input system (having 64 channels now, but to be expanded to 512 channels) is used for signal processing of strain gauge data.

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For Population Council

Mini Copes With Increased Workload

NEW YORK – When the Population Council here decided to upgrade from its IBM 1130, it went the mini route instead of the medium-scale way.

The nonprofit foundation concerned with the field of population turned to a Digital Equipment Corp. PDP-11/45 to cope with the increasing workload that was saturating the installed system.

The need for DP first became evident in the late 1960s. The council, which had been established in 1952 for research, training and technical consultation in population-oriented studies, was inundated with data as the result of a number of international surveys. The only quick and efficient way to reduce the data was through computer analysis.

Initially, the Population Council tried to have the data processed by the traditional method of batch processing in a DP center, but this proved to be too restrictive. A normal DP center employs a methodology that results in a long turnaround from the time data is first prepared until the final processed data is returned to the researcher. Further, there was no rapid and direct communication between computer and computer user, which tended to result in further delays in obtaining data in the precisely required form.

The first computer system installed at the Population Council's facility was the IBM 1130, which employed magnetic tape units to store data. The computer system was considerably more effective from the standpoint of obtaining data in a desirable turnaround period, and the demand upon it grew.

While the computer system was installed in July of 1971, by fall, it was obvious the only way to keep up with the increasing demand would be to upgrade the computer facilities in some fashion.

A grant of $200,000 was made available to permit the DP facilities to be improved, and investigations were undertaken to determine the most effective approach. Having had experience with 1130 systems, serious consideration was given to employing an upgraded 1130 system with more internal memory and more rapid and higher capacity external data storage devices.

Analyses of the proposed upgrade revealed it would have a limited growth potential, should further expansion be required – as trend analyses indicated might occur. Further, many users found the 1130 system relatively inflexible for the variety of jobs they required.

During the investigation for alternatives to the then-installed 1130 computer system, the Population Council discovered that the characteristics of minicomputer systems enhanced their desirability. A number of them had operating systems – software – that permitted some users to employ batch processing stations on the same system where others were employing time-sharing terminals interactively.

Other software features on some minicomputer systems included schemes to permit address of large amounts of memory and utility programs.

Both software and hardware considerations made minicomputers seem a favorable alternative to an upgraded 1130. While the individual hardware and software options were impressive, perhaps the most important consideration was that most minicomputer systems are modularly expandable. Thus, the minicomputer systems could be developed to fit immediate needs without either requiring the purchase of more equipment or software than was immediately required or raising concern that a configuration would be likely to limit further growth, according to the council.

System Speeds Production At Synthetic Fiber Plant

ANDERSON, S.C. – The Dow Badische Co. has installed three minicomputers at its nylon and polyester plant here to speed the production of synthetic fibers and to help with the automation of manufacturing processes.

One of the minis analyzes the operation of yarn-texturing machines in the plant's carpet-fiber operation. The second is used in process-development work, aimed at developing on-line techniques for monitoring and controlling the production of nylon fiber. The third controls the labeling and shipping of the plant's product.

All three are HP9600 systems from Hewlett-Packard.

Frank Fulton, who supervises the manufacturing systems group within Dow Badische's computer service department, pointed out that product uniformity is a primary consideration in the processing of carpet fiber.

This uniformity must be reflected not only in the fiber's objective properties – such as diameter and surface qualities – but also in properties that are more difficult to assess, such as "bulk" and "hand."

The importance of these elusive properties and the problems associated with measuring them have impeded the development of computer-control systems for the manufacture of extruded-polymer yarn, Fulton said.

Using a Hewlett-Packard 9600, Dow Badische engineers are investigating on-line data-acquisition and control techniques that could be used in a yarn-processing system. Such a system would include special sensors that would measure the yarn's more esoteric characteristics directly or indirectly.

At the same time, another HP 9600 is analyzing operating data – such as process temperature and throughput – from the plant's texturizing machines. This information is gathered by a data logger, which passes it to the HP 9600 in response to selective queries by the computer.

The HP 9600 analyzes the data statistically and searches for data indicating that a process variable might move beyond acceptable limits. If such a trend is found, a warning on a hard-copy terminal is printed to advise plant employees to make a correction.

At the end of each shift, the computer generates a statistical report derived from all of the data logged during the shift.

These reports can be used in correlating process conditions with the properties of a batch of fiber, as measured off-line in laboratory tests.

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Calendar

Nov. 17-19, New York – The Second Annual Computer Security Conference & Workshop. Contact: John C. O'Mara, Computer Security Institue, 43 Boston Post Road, W. Main St., Northboro, Mass. 01532.

Nov. 19-21, Las Vegas – 1975 Systems Engineering Conference. Contact: Jim F. Wolbrink, Institute of Industrial Engineers, Inc., 25 Technology Park, Atlanta, Ga. 30071.

Nov. 19-21, Austin, Texas – 5th Symposium on Operating Systems Principles, Contact: Dr. A. Ambler, Department of Computer Sciences, The University of Texas at Austin, Texas 78712.

Nov. 20-21, Palm Springs, Calif. – Technical Meeting on Pricing Computer Services (TMPCS), sponsored by the Special Interest Group for Measurement and Evaluation (Sigmetrics). Contact: JoAnn Lockett, Sigmetrics TMPCS, c/o Information Sciences Department, The Rand Corp., 1700 Main St., Santa Monica, Calif. 90406.

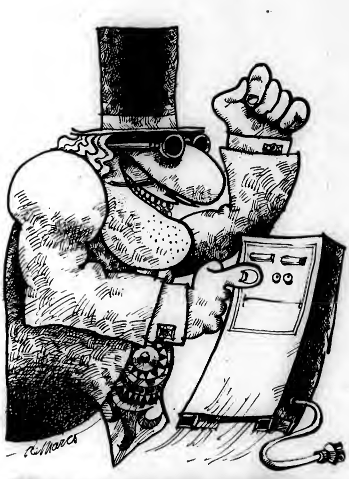
Nov. 24-25, Asheville, N.C. – National Association for State Information Systems (Nasis) Southern Regional Meeting. Contact: Nasis, P.O. Box 11910, Lexington, Ky. 40511.

Dec. 2-3, Washington, D.C. – 1975 Seventh National Transportation Systema Forum. Contact: Transportation Data Coordinating Committee, 1101 17th St., N.W., Suite 309, Washington, D.C. 20036.

Dec. 3-5, Denver – 1975 Cause National Conference, with the theme "Higher Education Information Systems: The Challenge of Change." Contact: Cause National Office, 737 29th St., Boulder, Colo. 80303.

Dec. 3-5, Washington, D.C. – "Government Computer Applications," sponsored by the American Institute of Industrial Engineers (AIIE). Contact: AIIE Seminars, P.O. Box 25116, Los Angeles, 90025.

Dec. 18-19, Sacramento, Calif. – 1975 Winter Computer Simulation Conference, sponsored by the Society for Computer Simulation. Contact: O.S. Madrigal, Department of Computer Science, California State University, Chico, Calif. 95929.



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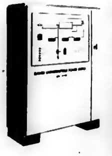

Hammer, Winkler to Lead NCC Steering Committee

MONTVALE, N.J. – The Steering Committee for the 1976 National Computer Conference (NCC) will be headed by Dr. Carl Hammer, conference chairman, and Dr. Stanley Winkler, program chairman.

Other Steering Committee members are Edward Zimmerman, bicentennial coordinator; Jackie Potts, computer graphics art exhibit; Norman Moraff, finance; Dr. Sema Marks, Student Computer Fair; Colonel William F. Luebbert, Historical Perspectives; Ronald Winkler, Esq., Legal Counsel; Ruben Maldonado, conference operations; Dr. Henry McDonald, NCC Committee liaison; Joyce Amenta, publications; Dorothy Ray, public relations; Adrian Basili, Science Film Theater; Thomas D'Auria, special activities; Lee Danner, special assistant; Cecil Shelton, secretary; Evelyn Bonney, awards; and Thomas Johnston, exhibits.

The 1976 NCC will be held June 7-10 in New York City. For further information contact: '76 NCC, c/o the American Federation of Information Processing Societies, Inc., 210 Summit Ave., Montvale, N.J. 07645.

Societies/ User Groups

Married Team Earns Citations

LOS ANGELES – The College of Engineering of the University of Wisconsin-Madison has conferred Distinguished Service Citations on a husband-wife team, Dr. Gerald Estrin and Dr. Thelma Estrin, both faculty members of the University of California (UCLA).

It was the first time in the 28-year history of the award that a husband-wife team has been chosen.

Dr. Thelma Estrin, director of the Data Processing Laboratory of the UCLA Brain Research Institute, was selected for "her pioneering work in the application of computers in biomedical research," while her husband, UCLA professor of computer science, was cited for "his internationally recognized work as a university teacher and researcher in the design and construction of computers."

Both Estrins were also cited for their key roles in developing the Weizac computer in the early '50s at the Weizman Institute of Science in Israel, the first large-scale computer developed outside the U.S. and Europe.

SCDP Headquarters Moves to U.S. Capital

HUDSON, Mass. – The Society of Certified Data Processors (SCDP) has relocated its headquarters to Washington, D.C.

Operation of the Washington headquarters in Suite 810 at 500 12th Street, S.W., is under the day-to-day supervision of Wayne J. Smith, named by the society to the new position of executive director.

Call for Papers

ASSOCIATION FOR COMPUTING MACHINERY (ACM) SIGPLAN/SIGGRAPH SYMPOSIUM ON GRAPHIC LANGUAGES, April 26-27, Miami.

The ACM Special Interest Groups on Programming Languages (Sigplan) and Computer Graphics (Siggraph), in cooperation with the Florida International University, is sponsoring the symposium.

Some suggested topics for papers are languages for animation, scene analysis, picture processing and extensions for graphics; graphic subrouting packages; and languages for writing interactive graphic systems.

A first draft of no more than 5,000 words should be submitted by Dec. 15 to Dr. Toby Berk, program chairman, Department of Mathematical Sciences, Florida International University, Miami 33144.

SECOND INTERNATIONAL CONFERENCE ON SOFTWARE ENGINEERING, Oct. 13-15, San Francisco.

The conference will emphasize, but not be restricted to, programming methodology, testing and validation of software systems, performance and design evaluation of software systems, data base management, software development management, software development tools and software for mini- or microprocessors.

Exemplary applications, practical guidelines and theoretically based papers are welcome. Abstracts are due by March 1 and completed papers by April 15.

Submit abstracts and drafts to the program chairmen, Dr. C.V. Remamoorthy, Department of Electrical Engineering and Computer Sciences, University of California at Berkeley, Berkeley, Calif. 94720.

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Announcement in Few Weeks

Burroughs Plans 800 Family Spanning Product Range

By Edith Holmes
Of the CW Staff

NEW YORK – Within the next few weeks, Burroughs Corp. plans to announced the first unit of a new family of computers spanning the range from small to large, Ray W. Macdonald, chairman of the corporation's board, told a meeting of the New York Society of Security Analysts here recently.

The first system, in the medium-scale category, is a multiprogramming system designed primarily for data communications and decentralized processing networks. It will have up to three times the workload capacity of the most powerful medium-size systems Burroughs currently has in volume delivery, Macdonald said.

"Users of the B2500 and B3500 systems introduced in the 1960s did not require reprogramming to use the improved power of the B3700 or B4700 first delivered in 1971," he noted. Similarly, users will also be able to move directly to the forthcoming 800 series without reprogramming.

Macdonald said the first of the 800 systems will be at the top of Burrough's medium-scale category, is now in production with customer deliveries scheduled in the first quarter of next year and will be generally competitive with IBM's 370/135.

During the second quarter, Burroughs plans to announce its next large-scale computer system, which will belong to the 800 family and will be fully compatible with all B6700 and B7700 systems, he added.

The 800 computers will be more compact in size than Burrough's current systems, reflecting extensive use of high-density microcircuitry in the processor, memory and input/output modules, Macdonald stated.

In addition, Burroughs plans in early 1976 to introduce a series of small systems to strengthen its position in this market as well. In production with test installations already in place, this series employes advanced LSI circuitry and processing techniques, according to Macdonald.

The third quarter of next year will see announcements from Burroughs for systems in the intermediate- to medium-scale category.

Peripherals Planned

Burroughs will also introduce peripherals for the systems in the 800 family next year. Among these will be high-capacity, high-speed disk systems to support interactive processing against large-scale data bases, Macdonald said.

By the fourth quarter, product announcements will include other disks and high-speed printers, he added.

In reviewing the existing product line, Macdonald observed orders for the B700 line received impetus from IBM's introduction of the System/32.

"The happy introduction of IBM's System/32 has added additional stimula-

(Continued on Page 45)

PTT, Mainframe Plans Concern Europeans

By Andrew Lloyd
Special to Computerworld

MUNICH – While most of the exhibitors here at Systems 75 were preoccupied with the way their markets are likely to develop in 1976, two major issues dominated the conference.

The first was the European mainframe manufacturing strategy and the plight of Siemens after the apparently imminent breakup of Unidata. The second was the rift between the German Post, Telephone and Telegraph (PTT) authority on the one hand and users and private suppliers on the other.

In the opening speech at the conference, the Bavarian minister for economic affairs and transport, Anton Jauman, urged concerted efforts be made on national and European fronts to strengthen the market position of the national computer manufacturers.

He also attacked the French and British methods of supporting domestic industry by guaranteed orders. "The successful firms outside Europe have founded their success on dynamic leadership and effective motivation," he said.

Concerning Siemens, it is thought Siemens is relying on future models of Unidata computers for its next range. This would put it in a difficult spot if the new Compagnie des Machines Bull management structure decides to stop development of the Unidata machines.

All the talk is of a link-up between Univac and Siemens, but observers say the possibility that Compagnie des Machines Bull may be dangling an attractive carrot to Siemens cannot be overlooked – despite what seems to, be intense German political annoyance that the French dropped out of Unidata.

PTT Unresponsive

At a telecommunications seminar, a representative of the German PTT responded to charges it is unresponsive to user needs.

A survey of 25 users' reactions to the PTT showed discontent, according to Klaus Dieter Kreutzer, general manager of Alldata-Service GmbH, Munich, who took the survey after a fight between users and the PTT last year.

CW at Systems '75

In a paper entitled "Restrictions Imposed by the PTT and Their Economic Impact," Kreutzer observed, "The degree of dissatisfaction was much higher than I had anticipated. The sample may be too small to be a sound statistical base, but it acted as a pointer."

Users' discontent stemmed from several PTT announcements last year of regulations restricting modem supply by private companies. Feelings ran so high there were parliamentary debates and several lawsuits in the summer.

"This is not a healthy way to carry on discussions with the PTT," Kreutzer said.

The PTT should make efforts to market its services rather than just distribute them, he recommended.

The PTT representative, Roswitha Wolf, listed some of the disadvantages of being a monopoly – like having to provide very unprofitable services.

In response to a demand for 24-hour

(Continued on Page 46)

Canadians' DP Business Good Despite Economy

By Nancy French
Of the CW Staff

TORONTO – The business climate for the sale of minicomputer systems and peripherals in Canada has been excellent for the past two years despite inflation and the worldwide recession, vendors said at the Canadian Computer Conference here recently.

However none would predict what effect the recently imposed federal wage and price controls would have on business in the months to come.

With the cost of living up 12.5% in the last months and unemployment hitting 9%, "economic conditions that confront the average guy here are just as bad if not worse than in the States – but the worse times are, the easier it is to sell computers," Paul Eckland, general manager for General Automation Computer, Ltd. explained.

"Companies are looking for ways to save money and automation is one of them," Eckland noted.

The emphasis on communications is a very significant part of the computer environment in Canada, according to Martin Durbec, national sales manager of Singer Business Machines.

"Computing is getting down to the people here," he pointed out. With the emphasis on processing and distributed processing, "the peripherals and terminals part of the business is very buoyant."

CW in Canada

Ron Boguski, Toronto branch manager for Inforex, agreed. "People are looking at different ways of saving money and more editing at the source is one way of reducing overhead," he explained.

Inforex, which concentrates its sales efforts on the Toronto metropolitan area, is emphasizing remote data entry equipment as well as its System 5000, which offers data base storage capabilities without the need for an on-line data base environment.

Dick Weber, manager of marketing communications for Data General (Canada) Ltd., said that firm's sales figures tell the story. Revenues from Canadian sales have grown 30% in 1975 – the same rate as in the U.S.

Technologically, "there is a strong parallel between the two countries, with Canadians exhibiting no gap in applications at all," he said.

Data General's new product line has helped, according to Weber, who said the company's C/300 has done very well here in a relatively soft market. The Nova 3 has been doing very well in the Canadian OEM market as well.

Better Than in U.S.

Mike Naggiar, Ontario district manager for Hewlett-Packard Co., said his firm's business is "holding up pretty well – in fact better than in the U.S. domestic market."

Sales are particularly strong, with a trend toward data base management, order entry and inventory control on minicomputers, he explained.

Users who want to go on-line are installing minicomputers and terminals in

(Continued on Page 45)

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Climate for DP Sales Excellent Despite Economy, Canadians Say

(Continued from Page 43)

remote locations and connecting them to large batch machines they already have in central offices, he said.

Bob Lundvall, sales manager of Digital Equipment Corp. of Canada Ltd., said DEC's business, too, has improved a lot, growing from $27 million in 1974 to $41 million this year.

Concurring with Naggiar's assessment, Lundvall added the market has also expanded in process control functions and for such things as peak power monitoring.

"Savings justify the expense for investment in a minicomputer," he said.

Others showed little concern for any further downturn.

M.S. Sev of Ampex of Canada, Ltd. remarked that while curbs on spending may affect government business, vendors don't stand to lose much on commercial accounts.

"A DP manager can always find the money to buy an extra disk drive," Sev remarked.

In addition, Ampex's entry into the OEM market here, which is tiny by U.S. standards, will help boost sales without the additional expense for market expansion Ampex involved itself in a few years ago.

"In 1969 and 1970, when we started our end-user operation, we were nationwide, and support was a problem. Now we concentrate on business in Toronto, Ottawa and Montreal," leaving business in western Canada to other vendors, he said.

Many companies here apparently have that same attitude, according to visitors on the floor from remote locations who said that, with the exception of IBM, "vendors don't come to us, we have to go to them" by visiting shows like this. The show drew more than 7,000 visitors from all over the country.

International Computers of Canada Ltd. (ICCL) is pressing forward with its 2903 general-purpose computer, offering it on a rental instead of purchase basis as a means of competing for a piece of the distributed computing market.

ICCL President T.W. Randall explained the firm received orders for 14 systems last year, the first year the 2903 was sold here, and "we're looking to double that this year."

Eckland

Durbec

CW Photos by N. French

Naggiar

Olivetti Focuses On Terminals

TORONTO – Housed in one of the largest exhibit spaces on the floor of the Canadian Computer Conference, Olivetti Canada Ltd. displayed a full line of terminal equipment which has had a "good reception in the Canadian marketplace," according to Ance Thatcher, district manager for the Italian firm.

"It was relatively easy to expand from an office products line into terminals," he said. "The competition is not as strong as it might appear."

The terminal business is not a hardware business but rather one of support systems and customer engineering, he pointed out.

With a full field engineering staff of 450 nationwide from its office products line to lean on and the means to maintain a full parts inventory in place, Olivetti's transition has not been too difficult, he said.

Olivetti has penetrated the marketplace here three times deeper than it has in the U.S., and that is justifiable, he noted, because American firms like to buy from other American firms.

Burroughs Planning 800 Series Family

(Continued from Page 43)

tion to this market sector and, in the third quarter, our orders for the B700 were two and one half times higher than in the first quarter, when the System/32 was released," he commented.

"We expect a continued strong rise in B700 order levels into the first half of next year," he added.

Burroughs expects modest growth in both revenues and earnings in the fourth quarter of this year and the first half of 1976, the security analysts learned.

"We look for an improvement in growth in the second half of 1976 and a resumption of good to very excellent growth in 1977," Macdonald said.

Macdonald told the group about Burroughs' acquisition this year of Graphic Sciences, a firm which manufactures equipment under the trademark of "Dex" for transmitting and receiving documents by communications lines.

"More recently, we entered into a definitive agreement for acquisition of Redactron Corp.," which makes word-processing systems, CRT monitors, cassette and cartridge drives and magnetic card units.

"The technologies represented in Redactron and Graphic Sciences products complement those of Burroughs, and there are commonalities in engineering and manufacturing from which we can derive future cost-effectiveness in product development and production," Macdonald said.

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CW at Systems 75

Swift Manager Says

Monitoring of Network Contracts Vital

By Andrew Lloyd

Special to Computerworld

MUNICH – Make sure a monitoring method is included as part of your contract with suppliers, warned Frank Holz, planning manager of the Society for Worldwide Interbank Financial Telecommunications (Swift) project.

In a lecture highlighting some of the problems of constructing an international data network, Holz urged users to keep project control methods and management methods as simple as possible.

The Swift net links most of the European countries with two computer centers in Brussels, Belgium and Amsterdam, The Netherlands.

The 200-man-year project will eventually enable member banks in 15 countries to handle 300,000 international transactions per day.

Offering a list of guidelines for other network planners, Holz said that not following these rules had led to problems for both Swift and its suppliers.

Areas that required careful planning were the computer sites, the system hardware, data communications, the conversion of user banks to standard methods system software and the preparation of user banks to connect to the network.

Holz said the general principles in planning and control adapted by Swift which should be applicable to large DP projects of many sorts were to:

- Establish the functions of the network early in the development process.
- Determine traffic volumes and provide a means for keeping them up to date. They will change.
- Be as literal and formal as possible when developing specifications.
- Coordinate closely with ordering and regulating bodies.
- Be conservative with estimates of time.
- Carefully monitor progress of all contracts and include the monitoring method as part of the contract wherever possible.
- Make project planning tools formal and an integral part of the development process. Keep it simple.
- Identify priorities.
- Never assume.

Exhibition International in '77

Special to Computerworld

MUNICH – Despite a cutback on some facilities for foreign visitors at Systems 75, the next Systems, in 1977 will be truly international, according to exhibition organizer Gerd Vom Hoevel.

Translation facilities were reduced at the user conferences this year because demand at the previous Systems (1973) had not been very high, organizers said.

Nevertheless, foreign participants at the conference program amounted to 30% of the 2,500 total, according to Vom Hoevel, who promised a truly international organization in 1977 with both English and French simultaneous translation.

Part of the process of internationalizing Systems will be to widen the panel of sponsors to include bodies in other countries and representatives of international associations as well as of German bodies, he said.

Plans of PTTs Concern Europe

(Continued from Page 43)

service on data transmission line maintenance, she pointed out this would mean trebling a labor force which already accounts for 55% of the PTT's costs and which the government has asked the PTT to cut back despite trade union pressures.

The PTT is making great efforts to improve its own communication and understanding with customers, Wolf said.

"First of all we need clear rules within our own organization as to who is responsible for what," she said.

"We are also embarking upon a program of training for our staff which will continue and hope thereby to offer better advice and consultancy services to our subscribers."

But the PTT requires more feedback from users on what they really need, she said. Her speech was greeted with what seemed to be cynical laughter in places and was followed by a lively question and answer session.

Kreutzer had asked users how well the German post and telecommunications authorities were carrying out their marketing of their services, if they were providing the sort of advice to users and manufacturers and if the level of maintenance service was right.

Exhibitors Cautiously Predict German Mart Upswing

By Andrew Lloyd
Special to Computerworld

MUNICH – There is a definite upward trend in the OEM business in West Germany, Europe's largest market, according to the U.S. Trade Center at Systems 75 here.

However, most exhibitors were less specific, and an atmosphere of cautious uncertainty surrounded the first few days of the biennial exhibition and conference here.

Although nearly all the 307 exhibitors anticipated the show would give some indication if and when the economic recovery in Germany would take place, not many expect an upturn in business before next spring.

Data gathered by the U.S. Trade Center here showed at least one sector of the computer business, the OEMs, may be pulling out of the slow growth stage it has experienced in Germany over the last 18 months.

"Evidence of the upward trend has come from the responses of the various sectors, including users, computer manufacturers and the exhibitors. A definite up trend in the computer business is to be expected," a spokesman for the U.S. Trade Center here said.

The German exhibition organizers suggested Digital Equipment Corp. was expecting a 40% growth in the minicomputer sector in West Germany – a figure unconfirmed by personnel on the DEC stand.

The Systems 75 organizers also said U.S. firms had already done $50 million worth of business in the first half of the exhibit, a figure which trade center officials would not confirm.

CW at Systems 75

Apart from the positive declaration of the trade center on the OEM suppliers, most exhibitors were less specific.

However, most appeared to be satisfied with their progress.

Most praised the level of visitor and the quality of inquiry at the exhibition.

There were 307 firms from 12 countries exhibiting, with the first appearance of Nixdorf computer and AEG Telefunken swelling the ranks of exhibitors.

The theme of Systems 75 – "computer meets the end user" – seems to have resulted in the right sort of end-user client visiting the exhibition, and most OEM suppliers were satisfied as well.

U.S. Projections for Mart

The U.S. government projections call for the German DP industry to grow not much more than 6% next year, for sales of more than $1.5 billion.

But these figures exclude minicomputers and terminals.

Although the U.S. has maintained its share of imported equipment in Germany, the overall value of imports had declined in relation to total consumption.

Nevertheless, the U.S. total contribution is significantly higher than the import value of $200 million, since IBM and many others have large manufacturing operations in Germany.

According to official sources, the best sales prospects for U.S. products are in intelligent terminals and certain types of high-performance peripherals such as fast printers, optical character recognition equipment and computer-output microfilm.

The market for the more traditional medium and large systems is beginning to show signs of saturation.

Tesdata Growth In Europe Seen At Varying Rates

By Andrew Lloyd
Special to Computerworld

MUNICH – Although Tesdata Systems Corp. President Tom Stone expects a 100% growth in Europe next year and a 60% to 70% growth worldwide, more modest projections were voiced by H. Vallbrecht, chairman of the Tesdata user group.

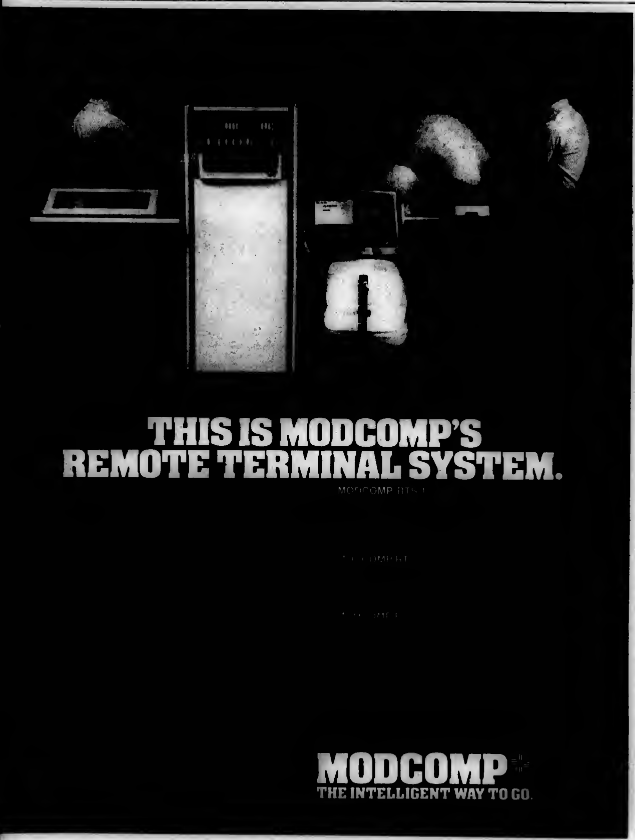
The field of performance measurement is growing slowly, mainly because of the economic situation, Vallbrecht said.

Stone said IBM Japan wants to use Tesdata's new MS series of hardware monitors instead of IBM's SMI for its development work in hardware and software.

Currently the only IBM use of Tesdata equipment has been by IBM user departments, he said. Stone is in Europe for the first European showing of the MS range and for a user group meeting.

Although Vallbrecht indicated he can cite quite a few cases where measurement tools have reduced costs, he said they are more likely to lead to better use of equipment than reduced volume of equipment.

"One large public authority took one of our studies and, after examining the results, sent several peripheral devices back to IBM because the customer realized they were no use at all," he said.



Unidata Future Uncertain

The future of the European DP scene is unknown as observers wait for the pieces to fall in place after several recent developments.

The future of Unidata, the European consortium of three DP firms – Compagnie International pour l'Informatique (CII), Siemens and Philips – is up in the air. CII is merging with Honeywell Bull, which leaves CII's role in Unidata in question, according to foreign press.

Philips is withdrawing from the large and medium-scale systems market, including the Unidata 7.720 project.

Siemens, the third partner, makes two of the Unidata machines and has the capability to make other models as well, press reports indicate.

The French government reportedly is moving toward restructuring its minicomputer area, probably using Thomson CSF as a focal point. The minicomputer activities of CII are not involved in the merger with Honeywell Bull.

Work Force Down

HIS Building Minis in Massachusetts

By Molly Upton
Of the CW Staff

BOSTON – Honeywell Information Systems' (HIS) principal thrust in Massachusetts will be in the minicomputer manufacturing area, Honeywell President Edson W. Spencer told a Rotary Club luncheon here.

HIS is in the computer business for the long haul, he said, and he has "considerable confidence in our ability to grow in this very exciting and very competitive business."

In explaining why the firm has reduced its number of employees in the Boston area to a total of about 6,000 for both the data processing and controls area, he cited technological developments and geographical growth of the company.

HIS employs about 5,000 in the Boston area now, which is nearly 4,000 fewer than two years ago, he said.

The computer industry has moved from a labor-intensive to a capital-intensive, high-technology area, he said, which has been reflected in a dramatic reduction in the size and cost of products.

The merger with General Electric (GE) caused HIS' business to expand geographically with more business outside the U.S.

Although Honeywell has closed plants in Framingham and Lowell, it has its minicomputer manufacturing in Brighton, its engineering in Billerica and peripherals in Lawrence. Field service is based in Newton, he added.

The firm brought production of its 7700 CRT terminals from Oklahoma City to Brighton so the Boston area can produce complete minicomputer systems, he observed.

CW Photo by M. Upton

Edson W. Spencer

Spencer told reporters he did not view this emphasis on minis as a replacement tactic for larger machines, but rather as embodying the "more and better" approach.

Minis definitely have a future in the distributed DP area, as well as in control systems, he said.

He would not comment on whether there will be a new line of minicomputers.

Spencer observed wryly that Honeywell missed its initial computer industry projections by a wide margin.

Its first business plan for the computer industry in 1955 called for 30 machines installed within three years, giving it 10% of the market on a $30 million investment. The venture would be profitable.

However, he noted, it was not until 1970 that the firm's computer business was profitable, after an investment of about $2 billion.

Computer operations have been profitable since 1970, he said, following the merger of GE into the firm.

The firm currently has 17,000 installations, which makes it number two in the industry, he said, with 10% of the world market.

Negotiations for the merger of Honeywell Bull with Compagnie Internationale pour l'Informatique are proceeding, and problems are "on the way to solution. The documents are in the hands of lawyers," he said, and the matter will proceed along the same lines as previously announced.

The letter of intent recently signed with Xerox to assume maintenance and service of its base should be effected by year-end. "This will make a positive contribution to revenues and earnings," he said.

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Data 100 Income, Sales Increase In Three Months

MINNEAPOLIS – Data 100 Corp. reported a 40% increase in earnings on a 35% rise in revenues for the third quarter ended Sept. 30 compared with the year-ago period.

Nine-month earnings were also improved.

For the third quarter, the firm earned $1.8 million or 51 cents a share, including a $780,000 tax credit, compared with earnings of $1.3 million or 43 cents a share in the year-ago period, when there was a $547,000 credit.

Despite the absence of nonrecourse sales to third-party leasing companies, revenues for the quarter rose to $24.6 million compared with $18.2 million in the same 1974 period.

President Edward D. Orenstein said the high proportion of long-term leases of terminal equipment, which the company records as sales, continued through the third quarter.

As a result, revenues from recorded sales increased 38% to $38.4 million while rental and service revenues totaled $29.6 million, a 46% increase in the nine months.

During the nine months, Data 100's earnings rose to $4.8 million or $1.35 a share compared with $3.2 million or $1.06 a share a year ago. Tax credits for the 1975 period were $2 million compared with $1.3 million for the 1974 period.

Orenstein said business in Europe during the quarter continued strong and the company's domestic business has now begun to show signs of improvement.

New order rates, though lower than for the same period last year, have picked up noticeably from levels during the first two quarters.

Partly due to increasing sales to OEMs, total shipments of all equipment were up at the end of the nine months, he said.

Sycor Net Rises In Nine Months

ANN ARBOR, Mich. – Sycor, Inc.'s earnings for the third quarter and nine months rose while revenues increased 48% and 34%, respectively.

Revenues for the third quarter ended Sept. 28 increased to $15.3 million from the $10.3 million in the year-ago period.

Sales were up 44% to $9.7 million; rental and service income rose 56% to $5.6 million from the same 1974 period.

Earnings totaled $1.9 million or 65 cents a share, including a $330,500 credit, compared with $1.5 million or 54 cents a share in the year-ago quarter when there was a $585,000 credit.

Revenues for the nine months were $39.6 million compared with $29.5 million achieved in the comparable period a year ago.

Earnings totaled almost $4.5 million or $1.57 a share, compared with $3.7 million or $1.33 a share for the year-ago period.

Credits during the 1975 period totaled $997,000 compared with nearly $1.5 million in the same 1974 period.

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position announcements

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Due to promotion excellent opportunity now is available in large Chicago area medical center for an experienced systems analyst. Main responsibilities will be in financial applications.

Qualified applicants will have had previous programming background in PL1 and knowledge of JCL. Degree in accounting or related area and experience in financial applications is preferred.

As a growing medical center we offer you the opportunity to grow with us as well as a good salary and benefits. Submit detailed resume including salary history to:

Employment Office
Loyola Univ. Medical Center
2160 S. 1st Ave.
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COMPUTER PROFESSIONALS

Developing new approaches to old problems

Systems & Computer Technology Corporation (SCT) was created in 1968 to satisfy the needs of non-defense, public institutions for Systems Consulting, Administrative Systems Implementation, and Computer Center Management Services.

The continued expansion of SCT's services within both our public agency and institutional markets in the Mid-Atlantic, South Florida, Midwest, Northwest, South and West Coast affords the following opportunities:

FINANCIAL SYSTEMS ACCOUNT MANAGERS

Requires current managerial experience in the design, implementation and required client training of financial systems for state/local government or colleges/universities, either as an employee of our consultant to the organization. Candidates should have a minimum of 3 years related experience, and preferably will possess either a degree in accounting or business administration or its equivalent in additonal experience.

RESEARCH/ACADEMIC SUPPORT PROGRAMMERS

Requires a minimum of 3 years experience in support of research or academic projects, solid FORTRAN applications, an Undergraduate degree and the ability to communicate well with research and academic faculty as well as students. Candidates should have experience with one or more statistical/mathematical packages such as SPSS, BMS, and a simulation language; knowledge of BASIC is helpful.

SR. SYSTEMS PROGRAMMER

Requires a minimum of 3 years systems programming experience including systems generation for OS/MVT and HASP. Will developed a comprehensive scheduling and accounting system for all computer usage; assist in planning for a growing 370/145 installation with VS-1 and/or VM; install and maintain non-IBM system utilities including Mark IV, FDR, FATS, Pan-Valet, Com-Pro; sysgen and maintain current operating systems software including OS/MVT, HASP, APL/360, and 3705 Emulator.

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Requires a minimum of 2 years in-depth experience working with GCOS, remote networks and time-sharing, and a strong technical background enabling the resolution of daily operational problems independent of vendor assistance. Will assume responsibility for all related systems programming functions on Honeywell Series 6000 Computer Systems.

These positions exist in the following computer environments-IBM 360/370 OS/VS, Univac 1106 EXEC 8, Honeywell 6600/GCOS series.

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PROGRAMMER/ANALYSTS

Requires 3 years experience in the design, implementation, and installation of general business, financial accounting or student information systems using ANS COBOL, ideally in a college/university environment. Candidates must possess effective interpersonal and communicative skills.

MR. DONALD B. MICHAELS
Manager - Human Resources

SYSTEMS & COMPUTER TECHNOLOGY CORPORATION
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Send resume to:
Director of Personnel
World Vision International
919 W. Huntington Dr.
Monrovia, Calif. 91016

Our opening

is for a programmer with a minimum of 2 years experience in NEAT/3. The position offers a high degree of challenge and career path opportunities. Please send resume and salary requirements, in confidence, to:

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Software - BAL - DOS-VS-360/370

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4 Senior Technical Staff	To $25,000+
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Contact T.E. Jenkins by confidential letter or resume, including present salary. Qualified candidates will be contacted with full particulars within 1 week. All employment costs paid by client company. FOX-MORRIS PERSONNEL CONSULSTANTS, 1500 Chestnut St., Philadelphia, PA 19102.

Growth, challenge and professional responsibility are key advantages in this position as Systems Programmer. We are looking for the person who wants to move ahead in the data processing field. For this individual, we offer a career opportunity in the Home Office Data Center of Indiana's largest multiple-line insurance group with the highest attainable policyholder and financial rating (A+AAAAA) by the A.M. Best Company, recognized insurance rating authority.

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We are equipped with IBM 370/158-VS/2 and our interest is in your background knowledge of VS SYSGENS, HASP and skills in IMS DB/DC. The ideal candidate will have a college background and 3 to 4 years experience. We offer superior working conditions, competitive salary and benefits, midwestern location and advancement potential. Our Company is growing rapidly and if you're on the way up we want to know more about you.

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Electronic Systems Personnel
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Detroit, Michigan, 48202

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444 Brickell Avenue
Miami, Florida, 33131

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370, ANS Cobol, TP, OS/VS 1 going to OS/VS 2. Banking Applications Demand Deposit, Trust Etc.

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The individual we seek will have project responsibility for in-house CRT monitor development from initial design through final production release. This position requires an individual with R&D experience who is capable of vendor and internal support group interface.

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Massachusetts is the state-of-the-art for systems programmers.

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Data General's hardware is high performance. And the software, which was created by our systems programmers, is designed to get all that performance out.

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Southboro is located about 35 minutes away from Boston. So if you decide to work here, you'll be close enough to a big city to enjoy its incredible cultural diversity. And far enough away to enjoy New England's enchanting countryside.

If you're a systems programmer who wants to move where the computer industry is going and where the small computer grew up, come to Data General and Massachusetts.

Where the state-of-the-art is.

Software Development Specialists

BS/MS computer science or equivalent with detailed systems and communication programming experiance. Strong assembly language programming skills with an interest in operating systems and compiler development necessary.

Send your resume, complete with salary history, in confidence to Mr. J. Masciarelli, Data General Corp., Route 9, Southboro, Mass. 01772. Local interviews will be arranged.

Data General

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If you're working vocabulary includes languages like ALGOL, BCPL, PL/1 or BLISS, with compiler development experience and you're tired of bit pushing in assembly code, we have the position for you.

We're looking for a person to join in an expanding development team producing language processors for the high end of Digital's family of computers. BLISS and interactive development tools are being used to produce high quality, sophisticated and timely language products for the system which is the industry's leader in time sharing.

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If you're interested in professional growth. Direct your resume to Julie Michaelson, Digital Equipment Corporation Dept. C1112, 200 Forest Street, Marlboro, Massachusetts 01752.

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To be responsible for:

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Systems Programmer

To assist in supporting a 370/145 OS/VS operating system in an on-line data-base environment. Maintain libraries of operating-systems programs. Evaluate interaction of various hardware and software. Support IMS/VS in TP environment.

Degree in Computer Science or Math (or equivalent) required, as is 3-5 years as OS systems programmer. In-depth knowledge of assembler language and OS internals also required. Knowledge of IMS DB/DC or teleprocessing preferred. Must be able to communicate effectively with non-technical personnel.

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- Must be familiar with all 360/370 OS Control Blocks and how to work with same.
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Present hardware consists of two (2) 370/155's and one (1) 370/158 Supporting OS/MVT, DOS/VS, VM, MVS, CICS, TOTAL, ENVIRON 1, and TSO.

Send resumes with salary expectation included to T. Stockermenn, Virginia National Bank, Personnel Department, 1 Commercial Place, Norfolk, Va. 23510.

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Midwest Location – Not Chicago
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Reporting to the division Manager of MIS and to a Corporate Executive Committee, this position offers high visibility. You will be responsible for directing a staff in planning, designing and implementing manufacturing, distribution and financial applications throughout the division.

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QUALIFICATIONS: B.S. Degree (M.S. preferred) in the physical sciences. Three years experience programming in FORTRAN and/or other languages and working knowledge of mathematical programming and statistics. Utah State University is located 85 miles north of Salt Lake City in a prime recreational area.

Send resume in confidence to: Wendell Pope, Computer Center, UMC 37, Utah State University, Logan, Utah 84322, 752-4100 Ext. 7286. Closing date November 21, 1975.

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Contact Sten Ourbas

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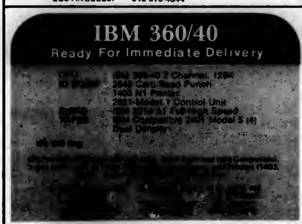

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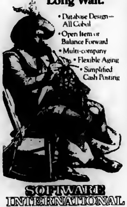

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For Quarter, Half-Year

Telex Earnings Show Strong Gain

TULSA, Okla. – Continuing its thrust toward sales rather than leasing of equipment, Telex Corp. showed sizable improvements in earnings for the quarter and six months ended Sept. 30 despite revenue declines.

For the quarter, the firm earned $1.7 million or 15 cents a share, including a $609 tax credit, compared with $221,000 or 2 cents a share in the same period a year ago.

Revenues dropped to $24.9 million compared with nearly $27.4 million in the year-ago period.

During the six months, Telex earned $3.6 million or 34 cents a share, including a $1.2 million tax credit, compared with the year-ago figure of $386,000 or 4 cents a share.

Revenues also declined, to $52.4 million in the half-year compared with $56.9 million in the same 1974 period.

The Computer Products Group reported a profit of $850,000 for the second quarter and $2.7 million for the six months. These figures reflect management efforts to cut costs and the emphasis on sales of equipment, according to S.J. Jatras, Telex president.

The Communications Group contributed $825,000 in the quarter and $984,000 for the six months.

The value of the backlog is down, with firm orders for sales or lease of equipment having a sales value of $14.3 million compared with $20.8 million Sept. 30 last year.

DEC Results Up In First Quarter

MAYNARD, Mass. – Digital Equipment Corp.'s first-quarter revenues and earnings increased over the year-ago period.

Earnings rose to $11.4 million or 95 cents a share compared with $7.5 million or 63 cents a share in the same period last year.

Revenues rose 26% to $140.5 million compared with $111.8 million in the year-ago period.

Service and other revenues rose 56% to $29.7 million; equipment sales for the recent quarter were $110.7 million.

Orders for minicomputers and peripheral products were noticeably stronger in the first quarter, the firm said. This customer demand was particularly strong in the business products and education markets. An improving trend was also noted in the OEM market.

Demand in the industrial sector of business, however, is still lagging due to restraint in capital investment, DEC said. Additionally, orders for the company's new line of microcomputers and terminals have continued to increase as unit production approached volume levels.

Orders for DEC's large system, the Decsystem-10, met expectation for the quarter, reflecting favorable competitive changes in the large systems marketplace and an emerging trend in renewed customer spending in certain of the market segments, according to the company.

A similar pattern in order and shipment trends was evident overseas, DEC said.

OSC Suffers '75 Loss

NEWTOWN, Pa. – Optical Scanning Corp.'s (OSC) 1975 results dropped to a loss of $891,911 or $1.36 a share compared with earnings of $598,012 or 91 cents a share, including extraordinary credits of $376,594, for the same period last year.

Revenues declined to $16.7 million compared with $19.2 million for the preceding year.

The company has repurchased about $1.8 million of its outstanding 8% subordinated convertible debentures from one debenture holder for $497,750 plus accrued interest.

The gain on this transaction net of income tax effect and unamortized debt discount will be reflected as an extraordinary item in 1976 financial statements.

DG Sets Records For Fiscal 1975

SOUTHBORO, Mass. – Data General Corp. (DG) finished the year with record sales and earnings.

Earnings for the year ended Sept. 27 rose to nearly $12.9 million or $1.51 a share compared with $9.9 million or $1.22 a share in 1974.

Revenues rose to $108.2 million compared with $83.2 million last year.

During the fourth quarter, earnings rose to almost $4.3 million compared with $3.6 million in the year-ago period. Revenues totaled $34.6 million compared with $32.1 million in the same 1974 quarter.

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Earnings Reports

SCI SYSTEMS
Year Ended June 30

	1975	1974
Shr Ernd	$.97	$.40
Revenue	25,054,482	23,780,540
Spec Cred	222,400	49,000
Earnings	710,098	265,780

ENNIS BUSINESS FORMS
Three Months Ended Aug. 31

	1975	1974
Shr Ernd	$.27	$.50
Revenue	13,931,717	14,834,809
6 Mo Shr	.49	.83
Revenue	27,333,185	29,947,988
Earnings	1,134,549	1,945,267

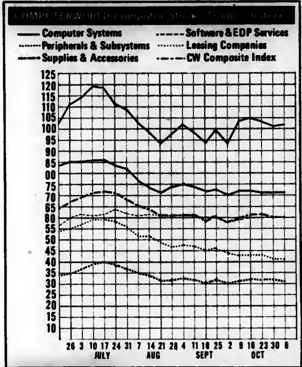
BASF AG
aSix Months Ended June 30

	1975 (000)	1974 (000)
Revenue	$1,590,000	$1,930,000
Earnings	82,000	157,500

a-Results computed at mark's current rate.

CALIFORNIA COMPUTER PRODUCTS
Three Months Ended Sept. 28

	1975	1974
Shr Ernd	.....	$.25
Revenue	$28,855,000	32,873,000
Earnings	(3,224,000)	781,000



DATAPRODUCTS
Three Months Ended Sept. 27

	1975	e1974
Shr Ernd	$.21	$.20
Revenue	20,209,000	21,079,000
Earnings	1,401,000	1,371,000
6 Mo Shr	.46	.41
Revenue	38,902,000	42,581,000
Earnings	b3,132,000	2,786,000

e-Restated to treat Data Card Corp. as unconsolidated subsidiary.
b-Includes gain of $739,000 from sale of Data Card Corp. interests.

INTEL
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$.83	$.53
Revenue	34,669,000	34,463,000
Earnings	4,370,000	3,475,000
9 Mo Shr	1.89	2.52
Revenue	96,535,000	103,172,000
Earnings	11,675,000	16,779,000

MEASUREX
Three Months Ended Aug. 31

	1975	e1974
Shr Ernd	$.17	$.32
Revenue	14,095,000	10,668,000
9 Mo Shr	.89	1.00
Revenue	41,141,000	28,899,000
Earnings	2,892,000	2,984,000

e-Restated.

DATA GENERAL
Year Ended Sept. 27

	1975	1974
Shr Ernd	$1.51	$1.22
Revenue	108,222,000	83,196,000
Earnings	12,851,000	9,895,000

DOCUTEL
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$.17	$.10
Revenue	7,382,000	7,159,000
Tax Cred	194,000	.....
Earnings	432,000	248,000
9 Mo Shr	.25	.....
Revenue	19,627,000	18,889,000
Tax Cred	288,000	.....
Earnings	640,000	(935,000)

COMSHARE
Three Months Ended Sept. 30

	1975	e1974
Shr Ernd	$.22	$.37
Revenue	3,449,664	2,902,514
Tax Cred	148,000	240,000
Earnings	301,800	501,000

e-Restated for accounting change.

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 5, 1975

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1975 RANGE (1)	CLOSE NOV 5 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	62-139	83	-2 3/5	-7.7
O	COMPUTER AUTOMATION	7- 10	10	+ 3/4	+8.1
N	CONTROL DATA CORP	11- 23	19 3/4	+1 1/2	+8.2
N	DATA GENERAL CORP	10- 38	35 1/P	- 3/4	-2.0
O	DATAPOINT CORP	6- 26	24 1/4	+1 3/4	+7.7
O	DIGITAL COMP CONTROL	1- 4	2 1/2	- 1/4	-9.0
N	DIGITAL EQUIPMENT	46-135	12P 3/4	+ 1/2	+0.3
N	ELECTRONIC ASSOC.	2- 3	2 3/8	+ 1/4	+11.7
A	ELECTRONIC ENGINEER.	5- 10	8 5/8	- 1/8	-1.4
N	FOXBORO	23- 42	27 5/8	+ 1/8	+0.4
O	GENERAL AUTOMATION	4- 14	5 1/4	0	0.0
O	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	58-120	100 1/2	-1 1/4	-1.2
N	HONEYWELL INC	22- 43	34	+ 3/8	+1.1
N	IBM	159-224	215 3/4	+4 3/4	+2.2
O	MEMOREK	1- 10	8 5/8	+ 1/2	+6.1
O	MICRODATA CORP	2- 6	6 1/8	+ 3/8	+6.5
O	MODULAR COMPUTER SYS	5- 19	9 1/2	+ 1/4	+2.7
N	NCR	15- 39	24 3/4	+ 3/4	+3.1
O	PRIME COMPUTER INC	2- 6	4 3/4	0	0.0
N	PERKIN-ELMER	16- 30	25 3/P	- 1/2	-1.9
N	RAYTHEON CO	26- 59	45 3/8	-4 1/P	-7.8
N	SINGER COMPANY	9- 17	10 1/8	+ 5/8	+6.5
N	SPERRY RAND	26- 49	43 7/8	+1	+2.3
A	SYSTEMS ENG. LABS	1- 5	3	+ 1/8	+4.3
N	VARIAN ASSOCIATES	7- 18	14	0	0.0
N	WANG LABS.	7- 17	11 1/8	+ 1/4	+2.2
N	XEROX CORP	51- 86	55 7/9	-1	-1.7

LEASING COMPANIES

EXCH		PRICE 1975 RANGE (1)	CLOSE NOV 5 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 5	2 5/8	0	0.0
A	COMMERCE GROUP CORP	2- 4	2 1/2	- 1/8	-4.7
A	COMPUTER INVSTRS GRP	1- 2	5/8	0	0.0
M	DATRONIC RENTAL	1- 1	1/2	0	0.0
A	DCL INC	0- 1	3/8	0	0.0
N	DPF INC	3- 6	4 3/8	- 1/4	-5.4
O	EDP RESOURCES	1- 2	1	0	0.0
A	GRANITE MGT	1- 5	4 1/8	0	0.0
A	GREYHOUND COMPUTER	2- 3	2 1/2	0	0.0
N	ITEL	1- 9	6 1/2	+ 1/8	+1.9
N	LEASCO CORP	4- 8	6 1/2	- 1/8	-1.8
O	LEASPAC CORP	1- 1	1/8	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NAC INC	0- 4	5/8	+ 1/8	+25.0
A	PIONEER TEX CORP	2- 7	5 1/2	- 3/8	-6.3
A	ROCKWOOD COMPUTER	1- 1	1/8	0	0.0
N	U.S. LEASING	7- 14	7 3/4	- 3/8	-4.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1975 RANGE (1)	CLOSE NOV 5 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 1	1	- 1/8	-11.1
A	APPLIED DATA RES.	1- 10	1 1/2	0	0.0
N	AUTOMATIC DATA PROC	29- 65	56	-1	-1.7
O	BRANDON APPLIED SYST	1- 1	1/8	0	0.0
O	COMPUTER DIMENSIONS	2- 6	3	0	0.0
O	COMP ELECTION SYSTMS	3- 7	7	+ 3/4	+12.0
O	COMPUTER HORIZONS	1- 1	3/4	0	0.0
O	COMPUTER NETWORK	1- 3	3 1/8	0	0.0
N	COMPUTER SCIENCES	2- 6	4 5/P	+ 1/8	+2.7
O	COMPUTER TASK GROUP	1- 1	5/8	0	0.0
O	COMPUTER USAGE	2- 4	2 1/5	0	0.0
O	COMSHARE	3- 4	2 3/4	+ 1/8	+4.7
O	DATATAB	1- 2	7/8	- 1/8	-12.5
A	ELECT COMP PROG	1- 1	1/3	0	0.0
N	ELECTRONIC DATA SYS.	12- 29	12	-3 1/4	-21.3
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	5/8	0	0.0
O	KEANE ASSOCIATES	2- 3	2 1/2	+ 1/4	+11.1
O	KEYDATA CORP	2- 3	1 7/8	- 1/P	-6.2
O	LOGICON	3- 5	3 1/2	0	0.0
A	MANAGEMENT DATA	1- 3	1 3/4	0	0.0
A	NATIONAL CSS INC	6- 14	10 3/8	- 1/2	-4.5
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 17	13 7/P	+1	+7.7
N	PLANNING RESEARCH	2- 6	3 3/4	+ 3/8	+11.1
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	2- 5	2 7/8	- 1/8	-4.1
O	REYNOLDS & REYNOLD	10- 24	15 1/2	0	0.0
O	SCIENTIFIC COMPUTERS	1- 1	1	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1 1/8	0	0.0
O	TYMSHARE INC	7- 21	19 7/8	+ 1/4	+1.2
A	URS SYSTEMS	2- 4	3 1/2	+ 1/4	+7.6
N	WYLY CORP	2- 4	3 1/8	+ 1/8	+4.1

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1975 RANGE (1)	CLOSE NOV 5 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	4- 9	7 3/4	- 3/8	-4.6
O	ADVANCED MEMORY SYS	1- 7	5 1/8	- 1/2	-8.8
N	AMPEX CORP	3- 7	5 1/8	- 1/2	-8.8
O	ANDERSON JACOBSON	1- 3	2 1/8	+ 1/8	+6.2
O	ARCHIVE MEDICAL ELEC	1- 5	3 1/8	- 1/8	-3.8
A	BOLT,BERANEK & NEW	5- 13	6 7/8	+ 3/8	+5.7
N	BUNKER-RAMO	4- 9	4 1/8	- 1/2	-10.8
A	CALCOMP	4- 7	3 1/2	- 1/P	-3.4
O	CAMBRIDGE MEMORIES	2- 5	2 1/4	- 1/8	-5.2
N	CENTRONICS DATA COMP	7- 25	18 1/4	- 1/8	-0.6
O	CODEX CORP	15- 38	34	- 3/4	-2.1
O	COGNITRONICS	1- 2	7/8	0	0.0
O	COMPUTER COMMUN.	1- 2	7/8	+ 1/8	+16.6
O	COMPUTER CONSOLES	3- 7	3 1/4	-1	-23.5
A	COMPUTER EQUIPMENT	1- 2	1 5/8	- 1/P	-7.1
O	COMPUTER MACHINERY	1- 2	7/8	- 1/8	-12.5
O	COMPUTER TRANSCEIVER	1- 2	1	0	0.0
O	COMTEN	2- 5	3 5/8	+ 1/8	+3.5
N	CONRAC CORP	12- 27	26 3/4	+2 1/8	+8.6
O	DATA ACCESS SYSTEMS	1- 3	1 1/4	0	0.0
O	DATA 100	5- 16	9 3/8	- 3/P	-3.8
A	DATA PRODUCTS CORP	2- 6	4 3/8	+ 3/P	+9.3
O	DATA TECHNOLOGY	1- 3	1 3/5	0	0.0
O	DATUM INC	1- 2	7/8	0	0.0
O	DECISION DATA COMPUT	3- 7	3 1/4	- 1/8	-3.7
O	DELTA DATA SYSTEMS	1- 1	1/8	- 1/8	-50.0
O	DI/AN CONTROLS	1- 1	3/4	0	0.0
N	ELECTRONIC M & M	1- 3	1 3/8	0	0.0
O	FABRI-TEK	1- 1	3/4	0	0.0
O	GENERAL COMPUTER SYS	1- 2	1 1/4	0	0.0
N	HAZELTINE CORP	3- 6	3 1/2	- 1/P	-3.4
N	HARRIS CORP	18- 31	30 3/4	+ 5/8	+2.0
A	INCOTERM CORP	3- 12	9 7/5	+ 1/4	+2.5
O	INFOREX INC	2- 5	2 1/2	- 1/8	-4.7
O	INFORMATION INTL INC	8- 14	12 1/2	- 1/4	-1.9
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	3/8	0	0.0
A	MILGO ELECTRONICS	8- 24	15 1/4	0	0.0
N	MOHAWK DATA SCI	1- 5	3 1/8	0	0.0
O	OPTICAL SCANNING	1- 3	2 5/P	0	0.0
O	PENRIL CORP	2- 2	1 1/4	0	0.0
O	PERTEC CORP	2- 8	4	- 3/4	-15.7
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	1- 1	1/4	0	0.0
O	QUANTOR CORP	2- 5	3 1/2	+ 1/8	+3.7
O	RECOGNITION EQUIP	2- 9	6 3/8	+ 1/4	+4.0
N	SANDERS ASSOCIATES	3- 11	8 1/2	+ 3/8	+4.6
O	SCAN DATA	1- 3	1 1/4	- 1/4	-16.6
O	STORAGE TECHNOLOGY	6- 17	12	- 1/8	-1.0
O	SYCOR INC	5- 17	17 1/4	+1 1/4	+7.8
O	T BAR INC	3- 6	6 1/4	+ 1/4	+4.1
O	TALLY CORP.	1- 5	3	0	0.0
O	TEC INC	1- 4	2 3/4	0	0.0
N	TEKTRONIX INC	19- 43	41 3/8	- 1/8	-0.3
N	TELEX	1- 3	2 1/8	+ 1/8	+6.2
O	WANGCO INC	4- 9	6 7/8	- 1/8	-1.7
O	WILTEK INC	1- 4	2 1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1975 RANGE (1)	CLOSE NOV 5 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	4- 5	4 1/2	0	0.0
A	BARRY WRIGHT	5- 7	5 1/2	0	0.0
O	CYBERMATICS INC	0- 1	3/8	0	0.0
A	DATA DOCUMENTS	29- 42	31 1/2	+ 1/2	+1.6
O	DUPLEX PRODUCTS INC	12- 25	15 3/8	- 3/8	-2.3
N	ENNIS BUS. FORMS	5- 7	5 1/8	+ 3/8	+7.8
O	GRAHAM MAGNETICS	5- 13	8 1/4	0	0.0
O	GRAPHIC CONTROLS	8- 21	12 1/2	- 1/4	-1.9
N	3M COMPANY	43- 69	57 1/4	+ 1/8	+0.2
O	MOORE CORP LTD	39- 51	45 1/4	+ 3/4	+1.6
N	NASHUA CORP	8- 22	11	+ 1/4	+2.3
O	STANDARD REGISTER	11- 20	19 1/2	- 1/4	-1.5
O	TAB PRODUCTS CO	4- 9	9	0	0.0
N	UARCO	17- 24	19 3/4	+1 1/4	+6.7
O	VANIER GRAPHICS CORP	4- 7	4 1/4	- 1/4	-5.5
A	WABASH MAGNETICS	3- 5	4	0	0.0
N	WALLACE BUS FORMS	15- 25	16 1/4	+ 1/4	+1.5

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